Aalto University
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# ROBOTIC PROCESS AUTOMATION AND ITS EFFECT ON CONTACT CENTER AGENTS' WORK AND RESOURCING

Case Study: Finnish Insurance Company

Master's Thesis
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The aim of this study is to understand and answer how robotic process automation (RPA) in back-office tasks affects agent work and resourcing in contact centers. The questions are approached from the sociotechnical perspective of information systems theory by looking at seemingly two separate issues as a singular joint-optimization problem that can have both instrumental and humanistic objectives.

Literature about robotic process automation is reviewed to understand the technical component of the study, the automation tool of choice alongside with contact center forecasting and resourcing to provide the context of the study. Other focal areas of the thesis are knowledge work, mindless and mindful actions, and work engagement which shed light on this thesis' social component, the customer service agent and subsequently their humanistic objectives. Resourcing focus is on understanding the potential instrumental objectives, such as operating efficiency and service level performance.

After the literature review the study continues with a qualitative case study of a Finnish insurance company and its contact center operations. In the case study, semi-structured interviews are conducted to both development advisors and agents to understand how RPA has affected agent work and contact center staffing, forecasting, and performance. The interviews were thoroughly analysed with focus on situations pre- and post-automation, and the changes ensued in the contact center. User observation of the planning process was conducted, and Case Company's internal material was used to understand RPA processes.

After the data analysis, it was possible to understand the agent work pre- and post-automation and analyse how the introduction of RPA has affected their work. The study shows that reducing mindless activities from agent work can offer higher engagement and reduce excess strain, subsequently offering agents more time in their main activity, serving the customers. Similarly, the data suggests that RPA can simplify the contact center workforce management processes and help the contact center serve their customers, especially reducing complexity and offering help with seasonal peaks in demand.

As the study shows RPA can enable more mindful workday designs for customer service agents and thus affect their work engagement in a positive way. RPA can also offer help simplifying the staffing process by reducing skills in the contact center's skill matrix, and reducing the required workload by taking care of back-office tasks on its own or alongside with the agents. Based on the existing literature and the case study, the findings are combined to a table and divided per humanistic and instrumental objectives. These findings offer new insight to task automation and how it affects the employees who work alongside the robots, which managers can utilize when choosing new automation targets.

**Keywords** Contact center, RPA, Workforce Management, Customer Service, Work Engagement

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Tämän tutkimuksen tavoitteena on ymmärtää ja vastata, miten ohjelmistorobotiikan (RPA) hyödyntäminen taustatyötehtävissä vaikuttaa asiakaspalvelijoiden työhön ja asiakaspalvelukeskusten resursointiin. Kysymyksiä lähestytään järjestelmätieteiden sosioteknisestä perspektiivistä. Sosioteknisellä lähestymistavalla voidaan nähdä olevan kahdenlaisia tavotteita, sekä inhimillisiä että suoritepohjaisia.

Tutkimuksen teoriaosiossa teknistä komponenttia, ohjelmistorobotiikkaa, sekä kontekstin luovaa asiakaspalvelukeskusten ennustamis- ja työvuorotustutkimusta käydään läpi. Näiden lisäksi tietotyötä, tiedostavaa ja tiedostamatonta toimintaa sekä työn imua koskevaa kirjallisuutta hyödynnetään, jotta agentin työtä voidaan myöhemmin analysoida ja arvioida teorian pohjalta. Agentin työ on tutkimuksen sosiaalinen komponentti.

Teoriaosuuden jälkeen tutkimus jatkaa kvalitatiivisella tapaustutkimuksella, joka keskittyy vakuutusyhtiön asiakaspalveluoperaatioihin. Tapaustutkimuksessa haastatellaan sekä asiakaspalvelijoita että yrityksen robotiikkatiimiä semistrukturoidusti. Tavoitteena on ymmärtää, miten RPA on vaikuttanut asiakaspalvelijoiden työhön, ennustamiseen ja työvuorotukseen, sekä asiakaspalvelukeskuksen suoriutumiseen. Haastattelut on analysoitu keskittyen aikaan ennen automatisaatiota ja sen jälkeen, sekä koettuun muutokseen asiakaspalvelukeskuksessa. Myös yrityksen suunnitteluprosessia on suorahavainnoitu ja robottien prosessikaavioita on hyödynnetty tutkimuksen apuna.

Data-analyysin jälkeen on mahdollista nähdä miten agenttien työpäivien ja tehtävien rakenne on muuttunut ohjelmistorobotiikan myötä asiakaspalvelutyössä. Tutkimus osoittaa, miten tiedostamattomien tehtävien vähentäminen lisää työn imua ja vähentää koettua kuormitusta, tarjoten agenteille lisää aikaa itse asiakaspalvelutyöhön. Tutkimus myös osoittaa RPA:n helpottavan resursointia vähentämällä työvuorotuksen kompleksisuutta ja tasoittamalla kausittaisten kysyntäpiikkien vaikusta palvelutasoihin.

Tutkimus osoittaa, että ohjelmistorobotiikan avulla voidaan luoda työpäiviä agenteille, jotka sisältävät enemmän tiedostavampia ja ajattelua vaativia työtehtäviä, ja täten edistää työn imua. RPA voi myös helpottaa työvuorotusta vähentämällä työvuorotettavia taitoja ja kokonaistyömäärää hoitamalla itsenäisesti osan back-office taustatyöstä. Aiempaan kirjallisuuteen ja tapaustutkimukseen perustuen tutkimuksen päälöydöt on kerätty yhteen ja jaettu inhimillisiin ja suoritepohjaisiin tavoitteisiin. Löydökset lisäävät työkaluja yritysjohdolle, miten taustatyötä voidaan automatisoida tehokkaasti ja työntekijöiden työoloja parantaen.

**Avainsanat** Asiakaspalvelu, Asiakaspalvelukeskus, Ohjelmistorobotiikka Työvuorosuunnittelu, Työn imu

# Table of Contents

# List of Tables

# List of Figures

# 1 Introduction

## 1.1 Motivation

As companies around the world and on all verticals continue to strive for higher operational efficiency and better margins, automations stock stays on the rise. During recent years, the realm of automation has included even the automation of knowledge work under its wings. Studying different automation methods such as robotic process automation have seen a growing trend in academia past couple of decades as the importance of process efficiency and the savings it brings may be the deciding factor between a successful company and a failing one. Alongside the sought-after efficiencies, companies have understood the value of their human capital, the employees, in the ever-changing work environment (Mendes & Stander, 2011).

Within fields and operations, where turnover and attrition rates are high and cost savings are always a target, such as contact centers, robotic process automation has been noticed as one simple yet effective method of automation. Changing the employees work from repetitive, non-cognitive, and rule-based work to value-adding, advisory work with the help of simple automation seems a lucrative deal for many contact center leaders. Within labor heavy fields, where labor costs can result in up to 80% of a contact center's operating costs the optimization of the personnel costs becomes and important subject. Studies of automations benefits are common within academia but understanding the potential hidden benefits that it may have on the employees can be valuable. (Anagnoste, 2017; Gans et al. 2003; Lacity et al., 2017)

This is especially true for insurance industry, which is also the case study company's industry since there are two major deciding factors when choosing the service provider. According to Peura-Kapanen et al. (2007) the insurance products and services are next to redundant when selecting service providers but 19% of failed transactions and cancellations are due to experiences with customer service and practical life with the services. According to the study the customers feel they need continuous support from the insurance company both when choosing the products and when claiming the insurances after an accident or other events that the insurance policies were chosen to protect occur. Peura-Kapanen et al. (2007) also point out that due to the insurance policies being intangible and hard to grasp, the customer service quality and availability are key drivers when considering the quality of the insurance itself. Thus, understanding the value that automation can bring to contact centers,

both its resourcing function and its employees, makes for an interesting case study and thesis subject.

## 1.2 Research problem, gap, and questions

Based on the challenges and motivation outlined, this thesis aims to answer the following two questions:

1) *How does back-office task automation affect customer service agents' work?*
2) *How does back-office tasks automation impact contact center resourcing?*

This study approaches the questions by first understanding robotic process automation, its weaknesses and strengths within automation realm and building criteria for task automation based on earlier research. Alongside RPA we acquaint ourselves with mindless and mindful actions and work engagement, to understand the motivational factors behind workday designs in modern work environments where autonomy is not the norm. One such example of a controlled work environment is contact centers, where customer service agents are steered to operate within given parameters, rules, and guidelines.

Robotic Process Automation and other business process automation methods have been popular in both business and academic fields for a while, yet sociotechnical aspects with information systems realm has not seen a similar rise, at least with RPA. Lacity & Willcocks (2017) and Willcocks et al. (2019) have identified the concept of triple-win where RPAs benefits are associated with three separate categories: employee, shareholder, and customer value and mindful workday designs have been studied in the field of psychology (Hackman, 1975; Langer, 2000) but this thesis aims to provide understanding on how even the modern-day Taylorism can be brought up to the 2020s and provide understanding on how this affects the working life of the agents by combining the two perspectives. Automation also has a potential impact on resourcing and staffing in the very same environment and this is approached as the flip side of the same coin. The benefits on the performance metrics are seen as the more traditional approach in automation academia, and serve as the context of this study as well as an instrumental outcome.

During the literature review I study contact centers from two perspectives: the role of a given agent and workforce management, to understand the how modern contact centers operate to serve their customers in the best possible way. The aim for the literature review is to provide understanding what are the characteristics for tasks suitable for robotic process

automation, and how does automation of those types of tasks affect the agent's work and contact center resourcing.

After building the theoretical frame the study turns to empirical research, which consists of a case study of a Finnish insurance company where a handful of back-office tasks have been automated in recent past. Case study focuses on how robotic process automation has affected Case Company's agents' day-to-day work and what kind of implications has the automatization had on resourcing. The data has been gathered by direct observations of their planning process, and with semi-structured interviews on both managerial and agent levels. The manager interviews are focused on understanding what has been automated, why those tasks where chosen and what kind of an impact has the automation had on resourcing and resource allocation. The agent interviews focus is on understanding the automations effect on the customer service agents work and work engagement.

## 1.3 Structure of the thesis

This study is concluded from introduction, literature review, empirical research, and discussions and conclusions. After introduction, the literature review covers robotic process automation technology, mindless and mindful actions with work engagement, to enable a characterization for task automation from two separate perspectives. Latter part of the literature review builds context about contact center resourcing and typical job characteristics of customer service agents. The review is concluded and summarized to understand our premise for the following empirical research. Within the empirical research, the methodology is justified, Case Company's customer service operation is introduced, and findings are presented from the data. The following section focuses on discussing the research questions from both the existing literature and empirical research perspectives and combining the two. Finally, conclusions are drawn alongside with managerial implications and naturally the limitations of the study are covered with suggestions for future research.

## 1.4 Case Company

The case company in this thesis is an insurance company (referred later as Case Company), which operates solely in Finland. They offer insurances through all walks of life for private customers and have other subsidiaries and sister companies who focus on other areas outside of personal insurance, but the focus of this thesis will be on the private customer side.

Case Company has in the past two years started to introduce robotic process automation into their contact center back-office tasks and currently operate 4 robots assisting their agents and customers. They have also recently invested in workforce management software to help their contact center management, enhance service levels, and drive their customer service to new heights. Case Company's private customer contact center consists of 4 separate teams and employs less than 100 customer service agents. They serve their customers through multiple channels including phone, email, and direct messaging through secure channels in multiple languages. The focus is on inbound customer service, and the teams have been divided based on their main channels which the agents operate.

The four robots that have been introduced operate in four completely separate tasks: 1) e-invoicing, 2) termination of contracts, 3) automatic delivery of green cards, and 4) lengthening of payment term, all of which have previously been manual tasks operated by the agents in the contact center. Case Company has had sufficient time to evaluate the performance of the robots and with the addition of newly introduced workforce management software it is a fruitful time to study the effects of robotics further in their customer service operations.

# 2 Literature Review

In this chapter, the thesis lays the theoretical groundwork in understanding the sociotechnical aspects of robotic process automation and knowledge work, and later the understanding of contact center resourcing and call center agent work. At the end of the section, the separate aspects are sown together to illustrate how RPA can act as an enabler for modern workforce and how RPA can affect resourcing in contact centers.

Analyzing the combination of technical and social components' joint optimization is in the core of information system theory's sociotechnical discipline as elaborated by Sarker et al. (2019) and Alter (2013). According to Sarker et al. (2019) collected description the technical component is an IT artifact created by a human that consists of hardware and software and can be utilized to solve problems and deliver tasks and the social component refers to either individuals or masses, who try to solve problems to serve their purposes. The sociotechnical perspective aims to fit and optimize the interplay of the two components and the optimization is expected to yield results with e.g. better efficiency as well as provide beneficial humanistic outcomes such as greater job satisfaction (Wallace et al. 2004). Figure 1 illustrates the sociotechnical perspective in IS as per Sarker et al. (2019).

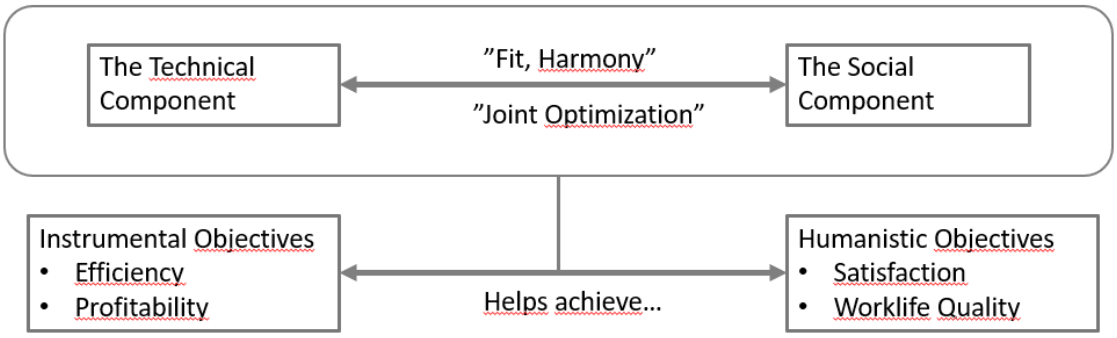


*Figure 1. A representation of the Sociotechnical Perspective in IS (Sarker et al., 2019)*

In this thesis, the technical artifact is robotic process automation and the software robots that are introduced into the back-office work processes, executing tasks and processes alongside human workforce. The social component is naturally the human contact center agents that work on the customer facing activities as well as back-office tasks that are the by-product of the customer facing activities. Understanding on a higher level than purely the activity level, how RPA affects the customer service agents' work and their engagement in

work is the main goal of the following section, which is also depicted in the humanistic objectives in Figure 1.

## 2.1 Robotic Process Automation

In modern digital age the focus has shifted from manual labor towards humans working side to side with computers, which have at the same time started to mimic human behavior. In the middle of this change Robotic Process Automation has established itself as the non-conscious yet human-like operator mimicking human behavior and fulfilling the tasks and jobs given to it just as humans would. Robotic process automation (RPA) is not a new introduction to the field of automation, but it is still a relatively new subject in the field of academia. According to the Institute of Robotic Process Automation (2015, p.10) RPA is said to enable the removal of manual and routine tasks from human specialists. Subsequently this can result in higher efficiency and lowering the costs of operations in many businesses, especially within back-office tasks and has thus evolved into a research topic among other verticals of automation technologies (Lacity & Willcocks, 2016).

Robotic Process Automation is a software solution, that enables virtual software robots to perform pre-defined tasks much like human workers would. The so-called robot, which can be translated into a software license, is taught, and programmed to perform a certain rule-based task such as moving data from one system to another without human input. This requires no alterations in the way of working compared to a human operator, but a robot can do the same activities more effective and in a less error-prone manner. Software robotics fits exceptionally well to processes that have inputs of structured data and possess readily defined outcomes. (Willcocks et al., 2016).

Software robotics and robotic process automation represent lightweight automation, where the robots are integrated on the front-end of the IT systems. This makes it a versatile and quick option compared to traditional automation, which is often integrated on the back end. Software robots can be thought of as working on top of other software, pressing buttons, and moving data from one point to another, navigating through multiple programs much like humans would. The robots are often trained by the actual users of the software and their configuration can be modified relatively easily. The software providers offer screen-recording and visual operating systems for the configuration, which negates the need of IT operations involvement in configuration process. They are also system agnostic and can

handle any type of systems and interfaces that a human worker can access and operate as well. (Anagnoste, 2017; Asatiani & Penttinen, 2016; Lacity & Willcocks, 2016).

Capgemini study (2017) characterizes RPA as an additional employee who works in between systems with various back-office processes and different business functions. They continue that very much alike humans, RPA copies humans' processes and in the end replaces human operators in those very processes, but with a much faster pace. They also name a software robot as a virtual FTE who works on the same tasks as its colleagues once did.

The robots are often cheaper than typical human workers. Previous research highlights the significant decrease in costs by pointing out that a difference between onshore FTE and a software robot may end up resulting in savings of more than 80%. The robots do not require vacation or overtime, rather they can be working 24 hours in a day with a lower cost and less errors. Other benefits of software robots also include speed, accuracy, and reliability. The predetermined tasks can be swiftly handled by the robot without typical human errors and lapses in concentration. (Anagnoste, 2017; Slaby, 2012; Willcocks et al., 2016)

Even with their many benefits, software robots are not perfect either. They only do what they are configured to do and are not capable of solving complex, non-rule-based issues where humans excel. They are simply not made to solve problems, just to deliver the configured task. According to Willcocks et al. (2016) the robots are limited based on the existing processes; if the process is faulty to start with the end-result will be hampered even though the robot would perform the tasks as asked for. They also point out that the automated process itself can hinder the robot and limit its effective working time. Asatiani & Penttinen (2016) also note that robotic process automation is not the best fit for heavy transaction masses and that it is merely a bridging software solution between manual human labor and large scale, enterprise level back-end automation. Suri et al. (2017) have concluded a list of main challenges in their survey which highlights e.g. the lack of standardized processes and resources, management support and lack of understanding of where RPA could be applied. Just like any other investments the need for a business case is apparent, and however the previous research would show positive results, this does not mean it is suitable for all the potential prospects and businesses.

Typically, software robotics is hitting its sweet-spot in the so called long-tail of the automation, where the two represented axes are 1) frequency of a singular event and 2) number of different types of events. Traditional IT automation is the front-runner when the frequency is high and number of differing types of events is low, but robotic process

automation due to its cost efficiency allows more flexibility when the number of differing tasks rises. However, if the cases are too infrequent the automation will not make sense economically due to the costs. (Imgrund et al. 2017; van der Aalst et al. 2018).

Viewing the sweet spot of RPA compared with other available technologies we can summarize based on Frei et al. (1993) analysis on the compatibility of automation technologies to work tasks based on their scope that RPA can act as a middle-man option. Simple and high-frequency tasks have options from all sorts of automation tools and full spectrum of projects and jobs have cognitive robotics to rely on, but software robotics provides a viable answer to anything that falls in between. Frei et al. (1993) continue that the responsibility of the automation tool itself grows linearly when moving from simple, single tasks towards the cognitive robotics.

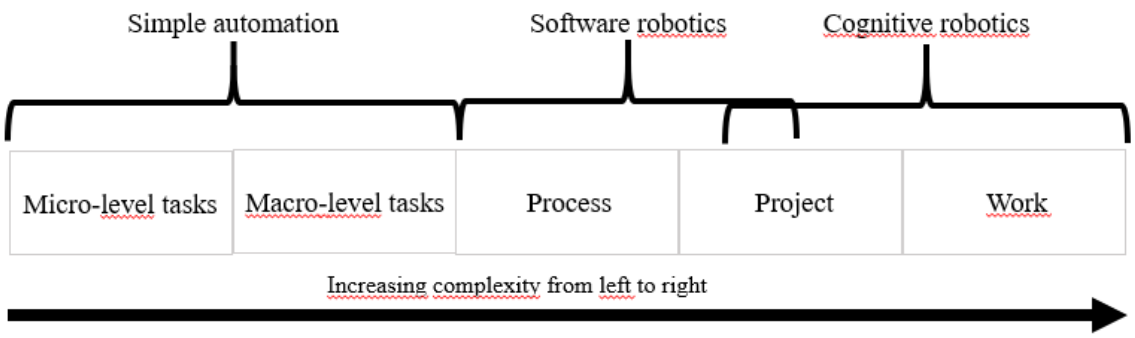


*Figure 2. Spectrum for automation based on Frei et al. (1993)*

In conclusion, robotic process automation offers a light-weight automation option for companies looking for efficiencies in their processes without spending heavily on full-blown back-end automation. RPA requires minimal IT intervention and utilizes the knowledge of the workers on the tasks. It is however important to note, like with any type of automation, that analyzing the underlying processes is key to success with process automation.

## 2.2 Knowledge work

Automation has offered possibilities for changes in the way we work and operate in our everyday life. The renewed work life means that we can work in a more individual, manifold, and distributed ways: work is not being tied to a certain spot or even time and the focus is shifted from manual and Tayloristic execution to more widespread knowledge work in many

jobs and fields. To build understanding on how automation affects customer service agents work, we need to form an understanding of what makes work engaging, mindful, and meaningful to an individual.

### 2.2.1 Changes in work life paradigm and work engagement

Knowledge work is defined commonly as creation and distribution of information and as work where intangible resources such as knowledge, experience, and skills are utilized as the main input for work (Davenport & Prusak, 1998; Alasoini, 2015). In today's business life there can be found many fields, where most of the workers could be characterized and classified as knowledge workers. In knowledge work a distribution can be drawn to distinguish separate flows of work for front-office work and back-office, where front-office functions focus on serving the customers and back-office work fulfills supportive tasks for the front-office (Rifkin, 1995). According to Rifkin (1995) the change in the working ways has been drastic after the technology has started the enablement for automating manual and work-intensive back-office processes and moving the focus of human labor to the front-office posts. This is also highlighted by Autor et al. (2003) research where they argue that lowered costs of computation reduce the value of routine jobs but subsequently raise the demand for educated workforce and their cognitive skills.

The concept of knowledge work and new work life is often used in a positive fashion when looked at the effects on empowering workers, having a say in their work, and engagement to work according to Alasoini (2015). The transition to knowledge work has been fast much thanks to the technological development. The shift in modern work life from workers processing mundane and given tasks to more information-intensive knowledge work has been the theme from late 20$^{th}$ century and continues to today. According to Alasoini (2015) the subjectification of work during the 21$^{st}$ century has given the employees more say in how they organize their work throughout the day, but has also meant that success is derived more from individual's motivation and commitment, rather than the pure efficiency of a given process. This has created a new focus area within academia called work engagement, which Bakker & Demerouti (2008) define as a positive state of mind that is filled with energy, dedication, and absorption. This definition includes an employee that feels themselves energized by the work, being involved and challenged, and feeling of being focused, even losing track of time while being engaged to work.

In today's environment, where companies have moved from tayloristic processes to focusing on employees being the driving force, businesses must inspire and enable their workers to focus in their work and deliver results through engagement. Companies are competing for the same top-end talent pools and expect proactive approach and commitment to their jobs, and at the same time the employers are looking to resources such as autonomy and skill variety to boost this. It is important to note that work engagement includes mostly positive factors related to in-role performance and work-life balance in comparison to workaholism. Previous research has highlighted at least 4 separate reasons that engaged workers perform better when compared to their nonengaged colleagues: experiencing positive emotions and health, creating their own job and motivating colleagues around them. (Bakker et al., 2011; Bakker & Demerouti, 2008).

Bakker & Demerouti (2007) in their Job Demands-Resources model highlight the interaction between demands and resources within a job, where resources offered and demands are in constant counteraction to each other, essentially trying to claim power over the other. The personal resources such as autonomy and feedback, and job resources e.g. optimism and resilience offer the base for feeling engaged to an individual in their work to enable high performance. Similarly, the job demands, such as work pressure, are counteracting the feeling of engagement and potentially hampering the good created from resources. Based on the resources available and demands aspects Bakker & Demerouti (2007) conclude that in situations where high resources and low demands meet the employees do not feel strain in their work but do feel highly motivated are thus engaged and vice versa. In a situation where both the available resources and demands are high the strain felt is only average, yet the motivation remains high.

### 2.2.2 Mindless and mindful approaches to knowledge intensive work

On top of knowledge management, the dichotomy in knowledge work can be filtered through the lens of mindless and mindful actions. The concept of mindful and mindless action can be analyzed from both the individual and organizational levels, however in this study the focus is on individual level. Individual mindful behavior and action is defined as 'the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment'' (Kabat-Zinn, 2003). Mindless behavior can be defined as non-conscious and automatic behavior that has been

molded into fixed-action patterns where the operator does not pay attention the action being performed (Papies et al. 2012; Croskerry, 2013).

Langer (2000) continues that with mindful learning we keep a more open mind and avoid falling into an unnecessarily limiting mind-set contrary to mindlessly accepting certain beliefs. Langer (2000) continues that in a mindful state we are engaged, notice new things and are sensitive to context. Mindless state of mind on the other hand means that we fall back to old and pre-programmed patterns as opposed to drawing new strings between distinctions. "When we are mindless, our behavior is rule and routine governed; when we are mindful, rules and routines may guide our behavior rather than predetermine it." (Langer, 2000, p. 220).

Mindless behavior can thus be characterized as falling into routines of clicking buttons, copy pasting data from one spreadsheet to another or any modern version of Taylorism, where no additional cognitive effort is needed. Mindful action is the counterpart of the mindless behavior, where the worker is required to input effort and thought into the actions, such as analyzing the given data and forming reports as outputs of it, or to create a marketing slogan for a customer company. The natures of the two could not be more apart but they can co-exist within same processes as well. In Nicholas Carr's book The Glass Cage: Where Automation Is Taking Us (2015), the US Department of Labor has already during 1970s analyzed based on Alfred Whitehead's pro-automation argument, that driving towards relieving the employees of their routine tasks means enabling their working time spent on more important matters. In customer service this could mean spending time facing and advising the customer instead of filling customer information from system A to system B.

Hackman et al. (1975) provide a job characteristics model on mindful and meaningful work where high workload pressure can still provide rewarding and motivating work. In the model, they have 4 separated titles for characterizing the work structure, which are implementing concepts, core job dimensions, psychological states, and personal and work-related outcomes. In the implementable concepts the focus is on creating natural work units and combining related tasks with open feedback channels which are then tied to the core job dimensions where important aspects are skill variety, autonomy and significance of the tasks that individuals work on. The critical psychological states felt by the employees are experiencing responsibility of the outcomes and understanding the results of their activities, which enables meaningfulness and thus work engagement. The outcomes noted in the design are high internal work motivation and quality performance, but also satisfaction with the work, low absenteeism, and creativity. (Hackman et al., 1975).

Relieving employees from their mundane and repetitive, mindless tasks can benefit the creativity and the value of the work. However, creating such mindful work designs where the focus is on enabling mindful work, it may result in negative psychological states as highlighted by Elsbach & Hargadon (2006). They note that with high skill variety it may cause less understanding of how their work influences the end-product or that high significance of the task at hand may feel challenging and cause unnecessary self-criticism in the employees. Elsbach & Hargadon (2006) argue thus that tasks with low cognitive difficulty should be implemented to the workday designs to relieve the cognitive load experienced throughout the day and open up bandwidth for the employees to mindlessly let their thoughts wonder. These mindless moments can act as a boost for creation when one may ponder other tasks than the one being currently performed. With tasks categorized as low cognitive difficulty Elsbach & Hargadon (2006) do not mean tasks unrelated to the core work rather than by-product tasks, such as back-office activities in customer service functions.

Releasing working time to purely mindful tasks by automating the simple routine tasks, it may also have other negative effects on the employees. Carr (2015) illustrates that once the software systems we use become more adept at thinking for us we become more reliable on those systems, which can already be seen in our society. Instead of thinking ourselves for the work of generation, we face degeneration effect with the automation (Carr, 2015).

Many of the characteristics for mindless and disengaging work and tasks could be characterized as mundane and routine which make them suitable candidates for automation from multiple points of view. The automation should act as an enabler in transitioning operative work to more mindful from employee perspective and routine-tasks are optimal candidates for automation in general as discovered earlier if they are rule-based as well. In the next section the study builds a characterization and criteria for robotic process automation within knowledge intensive work environments.

## 2.3 RPA enabling meaningful knowledge work

In this section the thesis focuses on tying up task automation from two different yet related perspectives: mindlessness of the task and automation potential. This section also introduces

a framework for viewing tasks from the two related perspectives based on the earlier research.

Many of the jobs and tasks humans perform in their work can be translated into straight-forward computer code following simple if-then-do rules. There are also many tasks where human cognition plays a significant role that are harder for rules-based technologies such as robotic process automation to wrap up. Subsequently rule-based patterns in tasks make substituting routine tasks simpler and offers computing the chance to work alongside the human operators on non-routine tasks. (Autor et al., 2003).

### 2.3.1 Automation potential of tasks

Van der Aalst et al. (2018) amongst other pointed out the long-tail automation where RPA excels. A high frequency in cases is required to justify the cost of automation which arrives from the need of integrations to various systems resulting in leaving lower frequency cases to manual labor. Where RPA does show its value is in between the cases where frequency starts to trend down but not to an infrequent occasion and where the cases are still consuming generally a significant amount of employees' time and resources. In conclusion, to safeguard hitting the sweet spot of RPA, the case frequency must remain considerable and the tasks at hand time-consuming to justify the introduction of RPA. (Van der Aalst et al., 2018).

Implementing automation such as software robotics creates changes into the way the work is handled in companies and functions. Rifkin (1995) pointed out the dramatic changes in labor already from 1980s and 1990s when banks and insurance companies started back-office automation and restructuring processes to focus the labor intensive work towards the customer facing processes reducing the amount of workers on the back-end of the processes and replacing them with automation. As previously discussed, the software robotics solutions can offer great benefits compared to manually operating existing systems, even with its downsides. Therefore, it is meaningful to allocate certain set of criteria for potential tasks to be automated to better understand where the realms of RPA are. In a Capgemini study (2017) they characterize typical candidates for robotic process automation to be repetitive of nature and tasks that are less than 30 minutes long, and they offer plenty of examples of tasks, such as mass email generation, periodic reporting and data entry, conversion of data, and ERP and other back office transactions.

Firstly, we have already discovered that the tasks at hand must be rule-based. This does not mean that the task should be simple since that is irrelevant from the perspective of

automation. If the tasks that are automated follow a certain rule-based logic and flow they can technically be automated without any further changes to the processes. This however does not indicate that the activity should not be reviewed to enable faster throughput time and in the end more efficiency. On the other hand, as Asatiani & Penttinen (2016) describe tasks that are non-routine or require high cognition are sub-optimal for task automation.

Not only is it important that the tasks follow a rule-based logic but also fulfill a significant amount of the workload at hand as Van der Aalst et al. (2018) highlighted. Fung (2014) defines workload characteristics for process automation within IT that include, but are not limited to, high volume and value for the transaction, and need of access to multiple systems within the process which are all good candidates for higher return on investment with automation in mind. He adds that there should be an understanding of the current manual costs to be able to justify the effect of the automation. Fung (2014) also names processes which are error-prone and have a high chance of rework due to mistakes made in the progress, with low amount of exceptions to be suitable candidates. The tasks that are to be automated should live in a stable environment to avoid rewriting and reconfiguring the automation logic to ensure the potential financial benefits attained from the automation (Asatiani & Penttinen, 2016; Fung, 2014).

| **Criteria** | **Description** |
|---|---|
| Relatively high frequency of tasks | Long-tail of automation to justify automation |
| Access to multiple systems | Process and steps move between multiple interfaces |
| Unambiguous, rule-based logic | Process easy to break down to pathway |
| Stable environment | Predefined rules in systems that do not change |
| No decision-making points | No choosing between multiple paths |
| Limited exception handling | Highly standardized with little to no exceptions |
| Low cognitive requirements | No interpretation or creativity required |

*Table 1. Criteria for RPA. Modified from Asatiani & Penttinen (2016), Fung (2014) and Slaby (2012)*

### 2.3.2 Mindless tasks in RPAs sweet spot

Tasks that have previously been defined to suit RPA could also be characterized as mindless and even blockers for engagement. These types of tasks and processes have often been potential candidates for RPA as characterized by e.g. Fung (2014) and Slaby (2012). Lacity

& Willcocks (2017; 2018) refer to the concept of triple-win, where the automation does not only bring value to customers and shareholders, but also to employees. Common fear for employees is that automation would make them redundant but more often it means a restructuring of their work. Within triple-win, the increased employee value has been caused with robotic process automation of tasks that had been felt as monotonous and boring and employees could thus focus on activities that had higher customer value and feel more interesting. This enabled the employees in the studies to learn new skills and offered more time to for the challenging parts of their work, resulting in more mindful work, higher employee engagement and in the end increased employee satisfaction. (Lacity & Willcocks, 2017; Lacity & Willcocks, 2018).

As Frey & Osborne (2013) highlight the automation potential for both cognitive and manual routine tasks, based on Autor et al. (2003), they see a longer road ahead for non-routine tasks even though they would be manually performed. How work and tasks are being performed naturally changes and morphs with the introduction of automation into different processes. On a mechanical level computational help increases the level of effort that can be diverted into non-routine, cognitive tasks by replacing the manual and mundane tasks. Thus, automation should also improve the productivity in these non-routine tasks since both the input to manual tasks arrives in increased quality and quantity and the time and effort focused on non-routine tasks is similarly increased with the shift. The shift also occurs in the skills required in a computerized workplace since rule-based tasks are automated and hence the tasks left are of more non-routine base. (Autor et al., 2003; Frey & Osborne, 2013)

The suitable tasks from RPA's perspective often include characteristics of tasks that can be described as mundane, routine-based, and monotone. The description resembles the definition of meaningless work which, as described in earlier sections, prohibits employees feeling engagement in their work. According to Weick et al. (1999) in environments where working conditions consist of demanding customer expectations, heightened competition, and high-performance levels it leaves small margins for errors where enabling mindful processes and work could be of help. As Willcocks et al. (2019) highlight the unexpected returns from automation resulted in not only better regulatory compliance with the help of automation but also increased employee recognition and skills. Suri et al. (2017) note that one of the biggest benefits from RPA is that you get to move your employees to more value-adding activities.

Automation should not however be considered as an automatic path to success. When searching for efficiency gains, employee value and in the end shareholder value, change

management is a key player. Willcocks et al. (2019) note that focusing solely on technology aspects of RPA development and deployment can cause issues and symptoms such as relevant participants and stakeholders stalling or resisting the change at-hand and potentially derailing the whole automation project. Thus, companies looking into robotic process automation should include end-users, educate them, and illustrate the potential benefits that come from changes in their work and not only focus on praising the efficiency and quality increases. Elsbach & Hargadon (2006) also criticized creating relentlessly mindful workdays by stating that the lack of mindless action throughout the days can create too much cognitive strain on individuals.

In conclusion, software robotics can offer tools to target mindless tasks and transform work from mindless, routine, and mundane to more mindful and engaging, where workers will need more of their human cognition that is currently hard to replace with automation.

## 2.4 Contact center resourcing and customer service agent's role

As we have gotten to understand robotic process automation and enablers for engagement in work, the study focuses on understanding our context: 1) contact center resourcing and 2) customer service agent's role. First, we get acquainted with modern contact center setup, capacity planning, and staffing to better understand the complexity and the challenges that contact centers face in their resourcing. Second, the focus is on a customer service agent's role, and the mindful and mindless aspects of their work.

As Sarker et al. (2019) highlighted the core of sociotechnical perspective of IS is the optimization of social and technical components. In this section we focus on creating understanding of the underlying factors of instrumental outcomes of the optimization. Instrumental outcomes of the optimization e.g. higher profitability and efficiency are analyzed in this thesis based on the changes RPA potentially has on contact center resourcing. On top of this, light is shed on the nature of contact center agent's job to better understand the demands and characteristics of the work.

### 2.4.1 Contact center overview – modern, multiskilled contact center

Contact centers in general exist to serve existing customers, upsell, and retain them, and in various cases also to attract new business. Contact centers usually handle several types of contacts including calls, emails, chats, and other types of channels for customers to reach

the company. In addition to the different channels contact centers also serve customers with different types of inquiries, requests and services which results in a complex environment to manage and maintain.

Contacts in modern contact centers are routed based on the agents' skill sets. It is not typical to limit one agent's skill set to ensure high-level of knowledge within certain areas and effective customer service, nor might it not be cost effective due to ever-growing need for training to maintain the skill set. Customers are also becoming channel agnostic and only expect to find an answer in a way that offers them good value. In such an environment the staffing allocation and resource distribution is challenging and only keeps on growing more and more complex. (Wallace & Whit, 2005; Cook, 2014).

As an illustration, let's consider two different types of contact centers: one very simplistic call center with one service queue and 24/7 operations with equal demand throughout the day, which could be an emergency service serving their customers only in one language, and a second one mimicking an insurance company serving their customers in 3 languages, 3 different insurances and 3 contact channels, operating 24/7 with equal demand distribution. If both contact centers employ staff with 8 hours a day contracts, the emergency service center could do with a simplistic 3-shift rotation where three staff pools operate on morning-evening-night rotation. If contact center 2 could have equal distribution with their skill structure, meaning the same number of agents can speak language 1, 2 and 3 respectively and operate all the channels and insurances, they could use the same routine. What the practice has taught us however is that this is hardly ever the case, e.g. due to uneven customer demand patterns. The amount of different skill combination permutations rises to 27, and perhaps only the most senior and gifted agents are able to staff all of the channels in all languages. This creates a whole new dynamic to the scheduling and planning.

Managing the staff of a contact center is often separated to its own function, called workforce management (WFM). Ibrahim et al. (2015) mention that managing the call center is a challenging task, where WFM needs to strike the balance with staffing levels so that the staffing costs remain optimally low without losing service quality and service levels. Understaffing a contact center means lowered personnel costs but also missing your service level targets, which may have other repercussions to the business. Overstaffing means covering the service levels and even overachieving but on the other hand it means additional personnel costs, since labor costs are a significant expense to the contact center, therefore workforce optimization and management are necessary. According to Gans et al. (2003) ca. 80% of a contact center's operating costs are due to agent and other personnel costs.

A well-functioning contact center can be a key deciding factor in maintaining competitive edge in some fields of business. Rust and Zahorik (1993) argue that retention rate is the driving force in maintaining market share and that it is driven by customer satisfaction and Nosek & Wilson (2001) point out excessive queueing times can result in negative ways to the customer's overall satisfaction. An example about insurance companies according to Peura-Kapanen et al. (2007) mentions the insurance products and services are next to redundant when selecting service providers but 19% of failed transactions and cancellations are due to experiences with customer service and practical life with the services. According to the study the customers feel they need continuous support from the insurance company both when choosing the products and when claiming the insurances after an accident or other events that the insurances were chosen to protect. Peura-Kapanen et al. (2007) also point out that due to the insurances are intangible and hard to grasp, the customer service quality and availability are key drivers when considering the quality of the insurance itself.

The job of the WFM team is to tackle the staffing balance between answering the correct amount of calls and contacts within the service level target with optimized staffing, so that there is no overstaffing (Ibrahim et al., 2015). To put it simply, WFM team ensures that there is a right person, with right skills answering to the customers reaching out to the company, at the correct point in time. Bhulai et al. (2008) define four phases for labor allocation, which is an essential part of WFM: 1) workload prediction 2) staffing 3) shift scheduling and 4) rostering. Workload prediction aims to provide the needed amount of work offered to the contact center. Staffing turns this amount of work into amounts of agents needed. Shift scheduling then meets the desired amount and rostering is the act of assigning these generated shifts to the employees.

Contact centers face a paradoxical challenge since their main goal is to create and maintain great customer relationships but have evolved heavily due to technological advances and have traditionally been targets of cost-cutting due to its labor heavy cost structure. This creates a problematic relationship with having to optimize productivity and enhance the quality of the customer service in the meanwhile. (Lewig & Dollard, 2003).

### 2.4.2 Capacity planning

As Bhulai et al. (2008) mentioned, workload prediction is an essential task within WFM. Forecasting can be done in various ways, but the end goal for forecasting for the long-term is to predict the uncertain future. The demand forecasting forms the very basis for planning

(Chase, 2016). This is also true for contact centers where the capacity planning function aims to create the workloads for the future, of which the agents will work towards. Ibrahim et al. (2015) state that forecasting accurately is one of the keys to achieving operational efficiency, since under forecasting leads to decreased service levels and longer queueing times and over forecasting subsequently to wasting money on overstaffing. In general, long-term planning and forecasting enables organizations to reduce slack in their operations yet enables them to serve their customers in a timely fashion. The models used in forecasting vary from time series analysis to regressive methods to educated guesses, but in the end the goal remains the same: form a workload for the uncertain future (Chase, 2016). According to Croxton et al. (2002) effective customer demand forecasting can reduce costs and influences customer satisfaction. Accurately forecasting the future demand is key in organizations for resource distribution such as staffing and long-term planning e.g. hiring decisions.

Typical forecasting process starts with data collection. In modern contact centers the telephony and other contact platforms gather the historical data of all the contacts that have been offered to the contact center, when have they been handled and what have the handling times been, along with other metadata depending on the platform. This enables the capacity planning to access the data via reporting or a workforce management system to start manipulating, validating, and analyzing the data. As Ibrahim et al. (2015) acknowledges the contact arrival rates are often time-varying, stochastic, dependent across time periods and subject to external events. The complexity arrives in contact centers from different contact methods and channels the customers can utilize and the sheer size of the service portfolio. Forecasters need to be able to not only forecast the arrival patterns of calls but also emails, direct messages and chats amongst others. This leads to a situation, according to Tanoury (2006, p. 40) where the forecasting is responsible for delivering accuracy in wide array of channels and skills, creating them often and adjusting them constantly.

Andrews & Cunningham (1995) state that contact centers also face a challenge with seasonality which is often different between channels and it may happen on monthly, weekly or even daily levels. This means that it is not enough for the forecaster to focus on months in a year since the patterns may vary whether Monday sits on the first day of the month or whether the month may start at the end of a week. Having the seasonality often does not hamper the intraday patterns of certain weekdays, like mentioned by Tanoury (2006). This means that the patterns can be very similar throughout all of the Wednesdays within a short period of time, where customers follow an intraday pattern that creates spikes in demand for

same times of day which would help intraday planning of breaks and trainings within said period.

In the context of contact centers, it is not only enough to know the contact arrival pattern and volumes, but also other parameters are needed to create the agent forecast for the planning function to be able to schedule effectively. Bhulai et al. (2008) included the staffing as their second phase of labor allocation called staffing. Different models, such as Erlang calculators are often used to translate the workload in hours and minutes to the forecasted number of agents per each individual scheduling interval. With these calculators that can be found in for example enterprise level workforce management systems the capacity planner would introduce certain parameters to ensure the translation from hours and minutes to number of agents. In Table 2 some Erlang parameters are introduced.

| Parameter | Description |
|---|---|
| Service level (%/s) | The service level target is usually expressed as a combination of a percentage and a unit of time. Service level is the given percentage and the service time the given unit of time. For example, 80/20, i.e. 80% of calls should be answered within 20 seconds. |
| Minimum occupancy | The minimum occupancy represents the lowest aspired occupancy level (%) for the selected skill at a given interval. Occupancy can be defined as (handling time + After Task Work) / Open for work time |
| Maximum occupancy | The maximum occupancy represents the highest aspired occupancy level (%) for the selected skill at a given interval. |
| Shrinkage | Shrinkage refers to loss of resources due to unplanned absence from the workplace, e.g. sick leave. |
| Efficiency | Efficiency is used to calculate how much of the scheduled time will be efficient work time. For example, an agent may need to ask questions or use the bathroom when they are scheduled to work, reducing the efficiency number |

*Table 2. Forecasting parameters from an enterprise level workforce management software* https://wiki.teleopti.com/TeleoptiWFM/Skill_Standard_Template/en

With the final end-product of capacity planning the contact center has a forecast in place for the longer term reaching over the scheduling period for e.g. hiring decisions and especially the agent forecast used for scheduling. In the agent forecast the desired granularity is to visualize the needed number of agents on skill level per each scheduling interval. This means in our example case from the earlier section the maintenance of 9 different forecasts, with three different forecasting methodologies due to differing channels. This example does not even take into account potential back-office work that are often either tied to the activity,

where it would most likely be acquainted in the handling time parameters, or separate back-office activities that is away from the productive customer facing activities.

### 2.4.3 Planning and scheduling

As Bhulai et al. (2008) had earlier defined, after the workload prediction and staffing we are left with shift scheduling and rostering. Shift scheduling means the act of creating a set of shifts that match the staffing requirements and rostering is simply defined as assigning the desired shifts to the employees (Bhulai et al., 2008). Chase (2016) highlights that staffing should be subject to forecasting and not vice versa, meaning that forecasting should only analyze the amount of incoming volume subject to the parameters and historical data, but not to take into accordance the handled volume patterns of previous periods. This would lead into potentially significant understaffing if handled volumes are used from days where there have been e.g. high abandonment rates due to spikes in volumes or high amounts of absences

In enterprise level workforce management systems the scheduling aims to match the targeted amount of work per each interval, e.g. an interval requires 4 agents to work on a certain activity to reach 80/20 service level, it will aim to staff 4 agents with that activity. However, in practice we know that there are restrictions to fulfill. These restrictions include, but are not only limited to union rules, predefined working patterns and other special agreements, contract hours daily, weekly, and nightly rest times and so on.

| Limitation/Restriction | Description |
|---|---|
| Minimum work time per week | Contract types minimum required amount of work for an agent needed to be fulfilled |
| Maximum work time per week | Contract types maximum required amount of work for an agent needed to be fulfilled |
| Skill restrictions | An agent needs to be assigned a skill to work towards, and that skill needs to be open for work |
| Nightly rest time | Minimum nightly rest time between two shifts |
| Weekly rest time | Minimum uninterrupted period of rest within a week |
| Special scheduling rules | Agents can have specific working rules pre-defined in their contract or that scheduling itself should follow a certain pattern such as preferences, rotations, availabilities etc. |

*Table 3. Work rule limitations from an enterprise level workforce management software. https://wiki.teleopti.com/TeleoptiWFM/Work_Rule/en*

Schedulers need to follow work laws, union agreements, internal guidelines and agents wishes when fulfilling the forecasted demand. They also may need to make decisions of where to overstaff or understaff if the flexibility is not available for exact pattern matching. Added complexity arrives from the different skills the agents have to fulfill the customer demands since within a fifteen minute interval span a multiskilled agent may not have time to answer multiple calls, even though they are assumed to do so when planned.

### 2.4.4 Role of the contact center agent

In this section the study reviews contact center agent's role from a Human-Computer Interaction perspective and discusses the task and job characteristics. Section focuses on highlighting the high stress environment, repetitive tasks, and the dissonance of the main purpose of contact centers in general and the challenges the agents face in their daily work.

The job of an inbound contact center agent can be generalized to facing customers in digital and voice channels, helping, advising, and upselling, and ensuring the customer's satisfaction to continue their journey together with the company. The work requires continuous interaction with the customers, numerous times a day. According to Zapf et al. (2010) the main activities for agents is to interact with customers and that call center work is a modern form of "Taylorism" since there is a low level of control for employees and the tasks can often be routine based. In modern contact centers the agents are expected to be adhering to their work schedules to serve the customers and it is not up to them to choose their working patterns as we discovered earlier in the WFM section, hence the low rate of say in their work. Even in the traditional call centers, where focus has been on telephony channels Zaph et al. (2010) suggest that there is a high level of stress attached to the interactions with customers. With the addition of new channels and activities to the agents work becomes more demanding, but also widen the scope of that very work.

Rust and Zahorik (1993) argue that retention rate is the driving force in maintaining market share and that it is driven by customer satisfaction as Nosek & Wilson (2001) point out excessive queueing times can result in negative ways to the customer's overall satisfaction. The agents face high demands to fulfill customers' expectations and play an essential role, naturally, being the front-line facing the customers and the importance of their effectivity and adherence can make or break the work of the WFM function. Considering a scenario, where forecasting and scheduling are on point to hit the service level target, but agents are missing their expected efficiency and adherence rates, it would mean an automatic

drop in the service level for those intervals. To ensure the service level rates it is important for the WFM team to balance the workload since the balancing can increase productivity of the workers when they are not overworked (Manas, 2014).

Certain assumptions about agent performance are made during the planning phases of workforce management. Creating the workload means that there is an underlying average handling time on the skills and agents are expected to perform according to these standards, which can include number of contacts handled per hour and day, adherence to schedule, quality scores and these scores are often visualized to the agents either individually or on a group basis. (Aiello & Kolb, 1995; De Ruyter et al. 2001).

In their work it is by no means unusual to face angry customers and even experience abuse in otherwise already high stress environment. The agents are challenged to keep their cool throughout the interaction and maintain the standards expected from the company when acting even in the nastiest of interactions and the work itself is described as stressful and repetitive of nature which is reflected subsequently in significant attrition and absenteeism rates compared to many other fields (Lewig & Dollard, 2003). De Ruyter et al. (2001) continue that in many service encounters the employees face unexpected situations regularly where the strong emphasis on following strict rules and guidelines lacks flexibility needed to satisfy the customer. Agents are expected to follow and perform according to rules and guidelines to deliver excellent customer service yet are expected to optimize productivity while doing this, further creating contradicting goals in their work (Lewig & Dollard, 2003).

## 2.5 Summary from literature review

In this section the thesis ties down the literature review sections and opens a framework to analyze the later empirical research data in a new light. First the focus is on combining the characteristics of tasks suitable for RPA to tasks that hinder work engagement and mindfulness. In other words, linking the mindless task characterization to repetitive, rule-based tasks that are subject to robotic process automation. The second section analyzes how freeing up back-office resources with automation would manifest itself in contact center resourcing.

### 2.5.1 Automation enabling mindfulness and work engagement

As we have already discovered in earlier sections, contact center back-office tasks can be mundane, routine and in general mindless. Thus, in this section we focus on understanding

how automating contact center back-office tasks that are a) mindless from the agent perspective and b) match the criteria built for robotic process automation, can enable work engagement. The focus is on back-office tasks since these tasks are merely a by-product of the originating customer contact, and if we consider the customer facing interaction as the value-creating part of the customer service process, automation on that part of the process should be reflected through other frameworks and lenses. Back-office tasks are often described as tasks where operators are not in direct contact with the customer or that they are not directly related to customers. Back-office tasks are relevant in customer service operations but can be of mechanical nature and often do not create customer value. (Di Leva et al., 2017; Aguirre & Rodriguez, 2017)

Based on the previous sections about mindless and mindful tasks and the review about activities that are candidates for robotic process automation, we can create a criteria for potential tasks in contact center back-office function that would be beneficiary with automation in mind. It was argued earlier that the software robots can often operate the very same tasks that human operators can with a fraction of the price, less error-prone and more effectively (Willcocks et al., 2016). Computers are also seen as more suitable to substitute humans in routine tasks and adding frequency to the routine output will according to Autor et al. (2003) task model increase the productivity of the non-routine outputs as well.

Deducting from Zaph et al. (2010) where call center work was named the modern-day Taylorism due to the low control level they have on their work, and combining the thoughts of relieving the employees from routine duties towards more cognitive effort, this leads to the potential conclusion that there will be tasks that with RPA, businesses could make customer service agents' work more mindful and engaging. Deductively according to Bakker et al. (2003) job-demands resources model in call center work environment reduction in mindless tasks does affect the high-rate of absenteeism, caused by work overload, emotional demands, and changes in tasks which are blockers for work engagement. Automating certain tasks would negate the need for some task changes throughout the day and potentially relieve work capacity to release pressure from agents.

It has been established that mindlessness occurs in jobs that are repetitive of nature, requiring little-to-no cognitive effort and consist of e.g. high-frequency of singular transactions. In contact center back-office tasks this could mean moving information from one system to another to copy notes from previous customer facing interaction. It has also been discovered that processes consisting of repetitive and rule based, high-frequency actions with no room for cognition are the sweet spot for RPA. The same example of a

mindless task could be used as an example of a potential RPA candidate, but it is important to note that this is not always the case. As Capgemini (2017) highlights that Robotic Process Automation is not only beneficial for companies, but also for employees from the very reasons noted above, it is meaningful and sound to combine the two separate subjects for further automation potential discussion.

The same positive effect on employees has been noted in Lacity & Willcocks (2017; 2018) studies where increased employee value is one of the three triple-win pilons. A common fear of being made redundant with automation has been somewhat negated in these studies, since the reduction in mundane and repetitive, mindless tasks has caused a re-organization of the work rather than reduction in work. The software robots have ended up releasing time to more challenging tasks and offered the employees in the studies to work on new areas and thus learning new skills and broadening their skill variety. This can be seen as an added job characteristic on Hackman et al. job characteristics model (1975) which is a positive factor when creating meaningful and engaging work. (Lacity & Willcocks, 2017; Hackman et al., 1975).

Even though releasing the mindful potential to customer facing activities in contact centers with automation seems to create a more engaging work environment to agents, it is important to note that mindlessness of certain tasks can spark creativity and feel like a breather break within a work day (Elsbach & Hargadon, 2006). Thus, the conclusion from earlier research is that by enabling agents to work on more meaningful, cognitive, and customer value creating tasks through back-office task automation increases work engagement to some degree, without releasing the agents to purely mindful activities to avoid overload and stress.

### 2.5.2 Automation reducing complexity in staffing and resourcing

As previously described, the workforce management function is faced with a challenging task of striking the balance between predicted customer demand and correct staffing levels, which can be a complex task. The key for the function is to put the right people, in the correct place with necessary skills, at the right time, to ensure the customer is being served in a timely, effective, and skillful manner. Based on this thesis focus' on sociotechnical aspects of information systems, this section aims to summarize and provide understanding on the instrumental effects, such as higher efficiency, of how automation of back-office tasks impacts resourcing and staffing.

As earlier established by Anagnoste (2017) that automation of back-office tasks can enable the move of working capacity from companies back-office processes towards the front-office actions. This would deductively mean moving more labor, hours and minutes of work, towards customer facing activities and thus ensure faster throughput times of customers from contact center queues in a scenario where other parameters remain unchanged. This could be potentially further enhanced by changing the underlying processes, but oftentimes RPAs focus remains on automating singular point-solutions rather than revamping the whole project, which could also be the case.

On the other hand, the companies will have the option at hand to not staff the freed resource from back-office to front-office, which would potentially cause no significant changes in service levels, rather in the amount of FTEs. This is one of the biggest benefits of RPA according Suri et al. (2017) but not as significant on their list compared to moving your employees to more value-adding activities. They also note that the automation offers benefits to customer service in general in their global survey. Autor et al. (2003) also note that added capacity to routine outputs would increase the productivity of the non-routine outputs as well, but in comparison to staffing from back-office to front-office its effect would not likely be as effective.

Lacity & Willcocks (2017) triple-win concept was earlier covered from the employee value perspective, but looking at the automation having a positive effect on staffing situation and reducing complexity in the process these could similarly be seen as wins from both the customer and shareholders perspectives. Customers benefit from reduced queueing times and faster processes when being handled, and shareholders can find competitive edge from customer service effectivity and quality.

Simply put, reducing the throughput time with automation, the handling time of one customer transaction would result in better service levels and faster average speed of answer. Or if the automation is not related to a back-office activity tied to a singular customer service transaction, rather than to a bulk of activities completed separately from e.g. the active phone lines, automation would deductively free that staff to the customer facing activities. Added benefit would also be discovered from being able to forecast and schedule on less competences if the back-office tasks were completed in bulk, but now automized.

Reducing the number of channels that need to be forecasted and staffed not only reduces the work at hand, but also the complexity. Less complexity reduces the risk of running into human-errors during forecasting and scheduling phases.

# 3 Case Study: Finnish insurance company

## 3.1 Research design and data selection

This study focuses on understanding complex socio-technical phenomena and aims to describe how automation affects two separate subjects: customer service agents work and contact center resourcing. The aim is to understand what type of tasks create work engagement and how can automation help shift focus towards these types of tasks from other mindless and mundane tasks. Additionally, the study aims to understand how automating those tasks affects contact center resourcing. Empirical research of this study is concluded as a single case study.

Case study is suggested as a suitable methodology when addressing complex issues, especially the ones that are considered difficult to examine and analyze with quantitative methodologies (Ghauri & Grönhaug, 2005). As the topic of this thesis covers sociotechnical phenomena where data is hard to gather and analyze with quantitative methods a case study was the chosen method for this thesis. Using case study as the research method it also allows focusing on investigating the phenomenon in its real-world context and retaining a holistic view (Yin, 2014). Inductive theory construction is used to analyze both research questions to avoid preconceived ideas without disregarding existing literature, yet remaining true to the data (Trauth, 1997). Case study methodology is suitable and designed to answer "how" and "why" questions with broad and complex backgrounds (Yin, 2003).

The data has been collected using various sources including Case Company's internal materials, informal discussions, direct observation, and qualitative interviews. The main source for the information and data has been semi-structured interviews conducted with the employees of the Case Company on two separate levels: managerial level and agent level. Altogether semi-structured interviews were conducted with seven participants and three managerial/development position participants took part in planning process observation. The table below shows the interviewee position and, if the interviewee took part in direct observation of planning process.

| Participant | Role | Department | Interview | Direct Observation |
|---|---|---|---|---|
| **Service Advisor A** | Agent | Service | X | |
| **Service Advisor B** | Sales Support / Agent | Service | X | |
| **Service Advisor C** | Agent | Service | X | |
| **Service Advisor D** | Agent | Service | X | |
| **Service Advisor E** | Agent | Service | X | |
| **Development Advisor A** | Project Manager | Development | X | X |
| **Development Advisor B** | RPA Developer | Development | X | X |
| **Development Advisor C** | Contact Center Developer | WFM | | X |

*Table 4. Interview and direct observation participants*

A list of open-ended questions was prepared for two separate groups accordingly, based on pre-determined themes. The structure of the interviews per each group respectively stayed the same, however with semi-structured interviews the answers to original questions spark follow-ups. Interview questions are attached as appendices in this thesis. Also, slight differences in the agent groups focus activities caused some differences into the processes they were most familiar with and thus focus shifted towards the most-known processes, naturally. Interviews were conducted via Microsoft Teams with voice and were recorded. Agent-level interviews lasted approximately 30 minutes and managerial-level interviews ca. 60 minutes. Themes for the interviews were provided to the interviewees prior to the actual interviews. Interviews were conducted in Finnish and then transcribed and translated to English for the thesis.

Direct observation was used with documenting and understanding Case Company's planning process along with informal discussions during the observation to clarify progress. The intent of direct observation was to understand how Case Company plans its workforce and what type of factors are they considering when creating the forecasts and working patterns for the foreseeable future. However, since the customer was planning the shifts for the first time with workforce management software this method is not used in order to analyze the automations effect on contact center resourcing, rather the informal discussions during the direct observation proved to be more fruitful in understanding how the back-office task automation has impacted resourcing and staffing process in the case company.

## 3.2 Data Analysis

The interviews were conducted in a semi-structured and thematic manner. The agent interview themes focused on individual's work pre and post RPA, and how they have experienced and view their tasks in both positions, and their feeling of the changes ensued. On top of this, the agents were asked about potential additional automation targets in their work. The managerial interviews focused on understanding what has been automatized and how, and how do they view the changes expected and resulted in an agent's work and contact center resourcing.

During the interviews, it became evident that focusing on singular processes was clearer to the subjects and the interviewer and thus the structure used in interviews lived slightly from the original format, yet still following the pre-defined open-ended questions. Interviews started with background questions and then changed course to focus on the processes that have now been automized. The aim was to understand agent life before and after automation, how the tasks had been handled and what changed. After the interviews and the transcriptions, the transcribed but not yet translated material from agent interviews were reviewed and comments grouped per five theme criteria: 1) processes and workday prior to automation, 2) processes and workday post automation, 3) agent observations about the changes in processes and workday 4) comments on resourcing effect 5) agent's personal assessment of the changes ensued. Finally, these interviews were compared with comments made on the same topics by managers (development advisors). Agents' personal assessments of changes ensued were compared to both expected changes pre-automation and documented changes post-automation.

## 3.3 Description of the Case Company

Case Company in this thesis is a Finnish Insurance Company (later referred to as Case Company), which provides insurance services to private customers and businesses, and asset management. The focus in this case study is on the insurance services for the private customers.

Within insurance industry there are two major deciding factors when choosing the service provider. According to Peura-Kapanen et al. (2007) the insurance products and services are next to redundant when selecting service providers but 19% of failed transactions and cancellations are due to experiences with customer service and practical life with the services. According to the study the customers feel they need continuous support from the insurance company both when choosing the products and when claiming the insurances after an accident or other events that the insurances were chosen to protect. Peura-Kapanen et al. (2007) also point out that due to the insurances are intangible and hard to grasp, the customer service quality and availability are key drivers when considering the quality of the insurance itself.

Case Company operates its customer service through retail locations and contact centers. The contact center is spread to a few physical locations, but all customers can be served from all locations without restrictions through different channels and three languages. The service channels currently operated in the contact center are phone lines, direct messaging through safe channels and separate forms which are congested into separate email boxes based on the task type. The other closely-knit operations to the private customer service are insurance claims handling and business customer service, which are out of the scope of this case study. Outside of their operating hours the private customer contact center utilizes outsourcing partner to handle some of their contacts.

### 3.3.1 Private customer contact center structure

The customer service teams are split to 4 different teams with 3 team leaders, based on their service channels. Two of the four teams serve customers mainly through phone channel with minor focus on the written channels of email and direct messaging, and the other two teams focus on written channels with little to no time spent on the phone lines. Some teams also include sales support staff that act as internal help desk, assisting agents in the most important and technically demanding tasks, with some customer service activities. All the

agents also take part on the residual back-office tasks that are tied to the customer service activity or that are spread out to the customer service representatives irrespective to any singular service activity. Altogether the contact center staff consists of less than 100 agents.

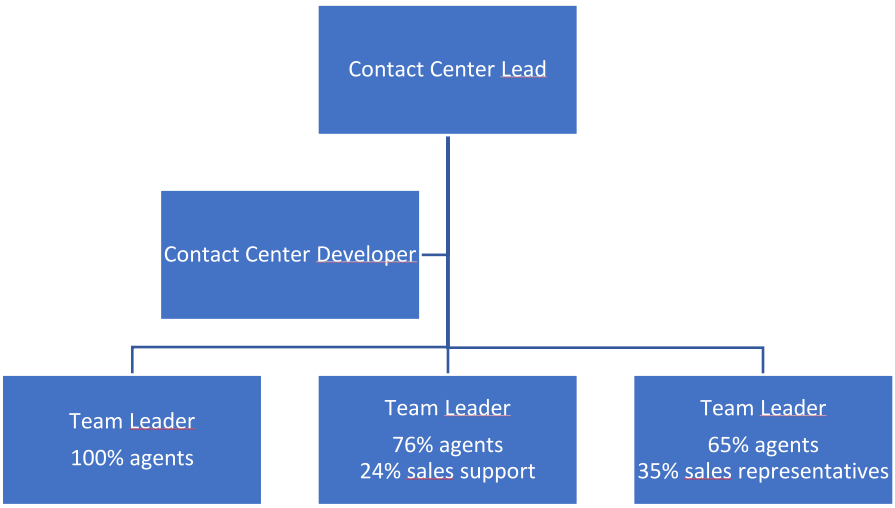


*Figure 3. Case Company contact center structure*

Case Company divides their agents based on two variables: inbound contact channel and skills. Most of the agents are trained on all their insurance offering, but there is a distinction on the open forms that separate teams handle, respectively. The other major factor to the type of tasks agents are assigned to is based on their main contact channel which steers their working shifts. Also, customers languages multiply the complexity of the staffing. This division per customer service teams is illustrated in figure 4 below.

| | |
|---|---|
| **PHONE TEAM 1** (24% of the staff)<br>Phone Inbound 85 %<br>Callbacks 5 %<br>Special customer callbacks 5 %<br>Direct Messaging 5 %<br>Additionally, assisting robot exceptions | **WRITTEN TEAM 1** (16% of the staff)<br>Open form emails 80 %<br>Phone Inbound 10 %<br>Direct Messaging 10 %<br>Additionally, assisting robot exceptions |
| **PHONE TEAM 2** (34% of the staff)<br>Phone Inbound 70%<br>Callbacks 10%<br>Direct Messaging 20 %<br>Additionally, assisting robot exceptions | **WRITTEN TEAM 2** (26% of the staff)<br>Direct Messaging 95 %<br>Phone Inbound (if needed)<br>Open form emails 5 %<br>Additionally, assisting robot exceptions |

*Figure 4. Task separation between contact center teams.*

Typically, an agent's day consists of one main task which is based on their team structure. An exception to the rule is that the phone teams need to handle other tasks outside of phone opening hours which can create their day to be more diverse and phone shifts also include 30 minutes of scheduled time for catching up on old cases, eLearning or for doing any administrative work that is left over. Full-time shifts also include 2 breaks and an unpaid lunch. In general, an agent's day consists of 2 to 4 scheduled main activities, where one of them fills more than 70% of the days effective work time.

### 3.3.2 Workforce management in the Case Company

Workforce management function in the Case Company's private customer service main job is to ensure that customers are being served on-time within the service level targets and ensuring longevity of resource planning by budgeting. To maintain this the WFM team list their tasks as follows: forecasting, shift scheduling with resource allocation, absence

handling, vacation planning, meeting and training planning, reporting on historical performance and real-time traffic management, and administration of flex-time for agents. In this thesis, the focus is on activities between long-term planning and budgeting to scheduling, excluding post publishing activities such as real-time traffic management and daily management.

Workforce management is led by contact center developer who reports to the contact center lead. The team leaders also play a role in the WFM process, but the responsibility of long-term capacity planning and forecasting is on the contact center developer's shoulders. The developer is responsible for most of the activities starting from long-term budgeting and planning to the release of schedules to the agent population. This person thus has vast responsibility in the broader success of the customer service organization and service level performance and they use workforce management tool to drive the process.

# 4 Findings

In this section, I introduce the findings that have emerged from the case study. This section is divided into three subcategories where firstly the focus is on automated tasks within the Case Company's customer service, secondly on findings around customer service agent's work, and third on the automation's effect on contact center resourcing.

## 4.1 Robotic Process Automation in the Case Company

Case Company has introduced 4 different robots to their customer service back-office processes that assist their customers and agents. The first robot was introduced in mid-2018 and the latest one in late 2019. All their robots are created with robotic process automation software and with development help of an RPA consulting company. Case Company have by themselves defined the paths for the robots, but the partner company has developed them and maintains the robots. Their task criteria for RPA was simple in the beginning:

> *"We started looking at tasks that are simple and straight-forward processes that involve a great mass of actions and include a multitude of tasks within them" (Development Advisor A)*

There are other nuances that are relevant from the automation perspective such as that work from all channels pile into one location, and that the processes need to have a singular start and end points to enable RPAs rule-based logic. Mainly, however, the processes have been chosen with certain business cases in mind and the simplicity of the process flow has been a secondary attribute.

The first robot they introduced (referred to later as TERM) terminates contracts that include the termination of all the insurance policies provided to the customer, per a notice from another insurance company. If the customer wants to terminate less than all of the policies, it will create an exception that will be manually handled by an agent. It was chosen to be the first robot because of high and seasonal volumes, but also due to its simple process. Needless to say all of the terminations where handled manually prior to the robot's introduction.

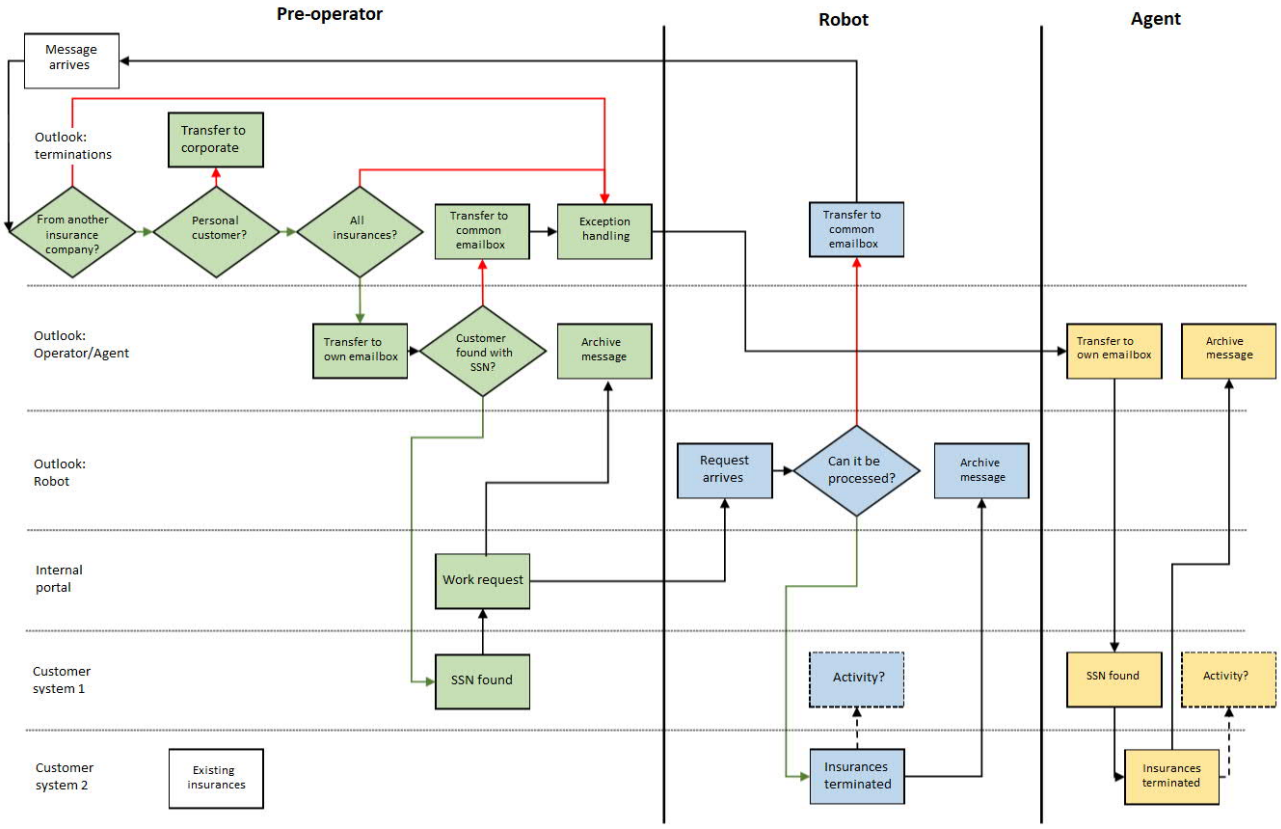


*Figure 5. Robot TERM process*

The second robot (ref. BILL) helps customers by assigning a longer payment term for their open invoice. If a customer has an open invoice with payment date in the next month and the customer asks for more time to pay, the robot can assign a new payment date that is further in the future than initially, based on certain parameters. If the payment date is too close to current date or the invoice is not yet created, the robot can't handle such requests and these would be handled by human agents. This robot still faces competition from human agents since customers may still ask for this service during a telephone call. The case company's development advisors noted that initially it was key to have the agents lead customers towards the robots to ensure higher adoption rates, instead of having the agent doing it for the customer. Customer service agent noted in their interviews that sometimes they would feed the request for the customer to the robot to avoid painstaking guiding through the phone.

The third robot (ref. GREEN) helps customer order and Green Cards that are used as proof of insurance when travelling abroad and then sends a printing request to a centralized

mailing location that will deliver the certificate to the customer. The robot gets a request fed to its mailbox that is based on a customer filled form with relevant information about the insurance account and the car the policy is related to. The request is handled by the robot and sent to central mailing location since the end-product of the process is a physical certification that needs to be traditionally mailed to the customers home address.

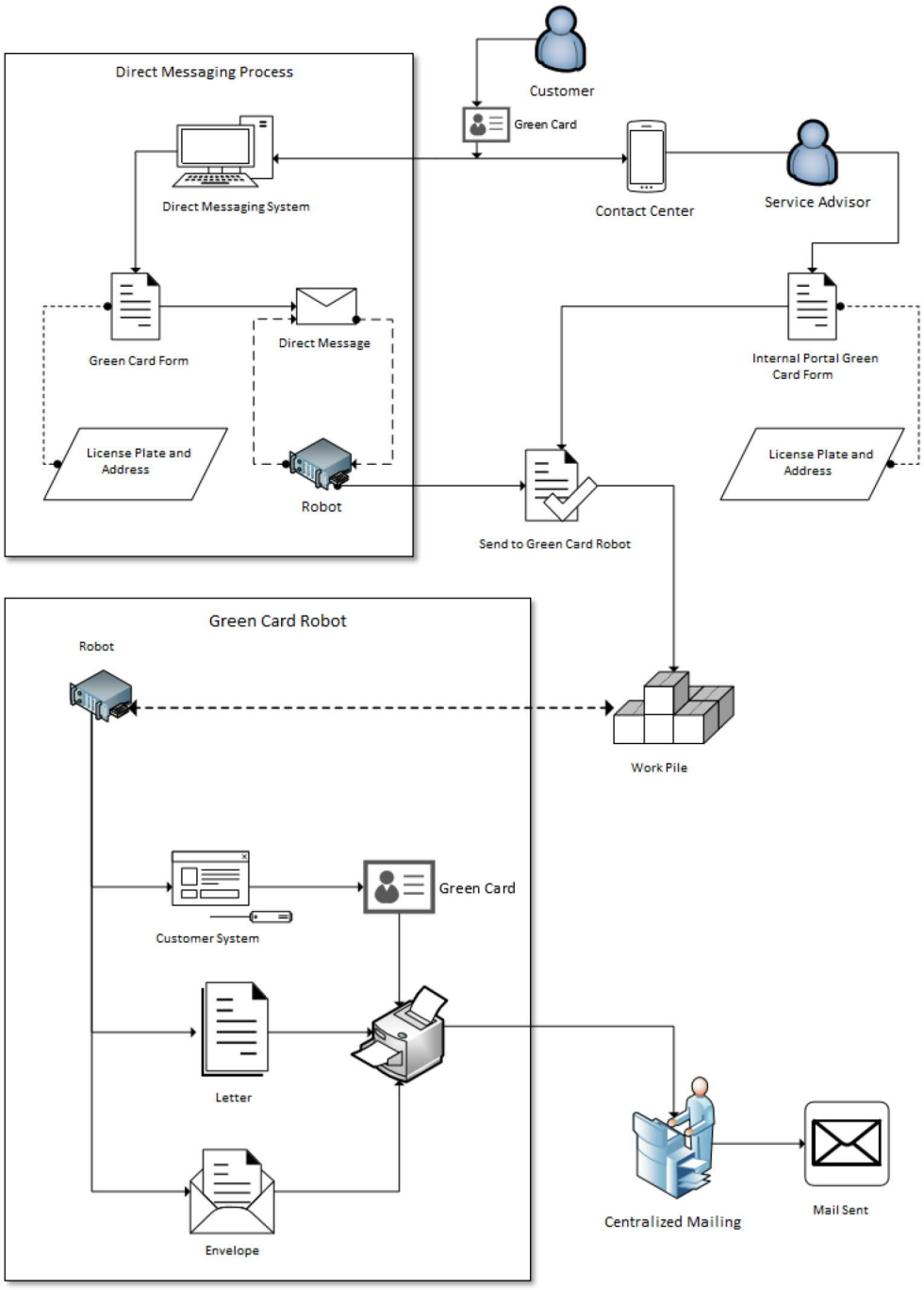


*Figure 6. Robot GREEN process.*

The fourth and final robot (ref. E-INVOICE) helps customers adopt e-invoicing instead of the traditional paper invoicing. This robot however was deemed to have minor effect on resourcing and ways of working for the agents, and it will not be assessed deeply in this thesis.

| Robot | Task Description |
|---|---|
| TERM | Terminate all insurance policies, that other insurance company has sent notice of on behalf of the customer |
| BILL | Lengthen the term of payment for an open invoice |
| GREEN | Print out and mail customers Green Card for car insurance |
| E-INVOICE | Change customers invoicing method from paper invoices to e-invoices |

*Table 5. Case Company's 4 software robots with short task descriptions*

Case Company keeps on looking at further task prospects for new robots and have even tried to develop their own desktop robot with open source software, but quickly decided against this approach.

## 4.2 Customer service agent's work

Second section covers findings that have emerged from the semi-structured interviews with customer service agents in Case Company. The interviews were focused on understanding the daily tasks and task characteristics of the a customer service agent within the case company and how the workflows and workday design has evolved after robotic process automation has been introduced to the contact centers back-office processes. The main work for agents is to serve and advice customers on insurance policies and potentially upsell. These agents' day consists of working in different customer channels depending on their skilling and area of expertise, but in general all of them are there for the same goal: serving their customers.

### 4.2.1 Workday and task characteristics of contact center agents prior to RPA

Contact center agents are required to use multiple systems during their workday and singular customer interactions. This may require fetching customer information from one place,

entering customer input to another system, and saving customer interactions outcomes to the third one. Altogether the agents at the Case Company mention 6 different main systems that were being used prior to RPAs introduction, including email, customer portal, insurance systems etc. An example of a Case Company's process to highlight the interlink within a singular customer interaction for all the systems used:

> *"Customer contacts us either through a form or a direct message. The message is read in the system, then I need to go to customer portal and print out a physical paper. Then I fetch the paper printout and mail it to the customer's home address. I needed to use three different systems, fetch the printout and mail it." (Service Advisor A)*

Tasks and activities that have prior to RPA been handled by the agents consisted mostly of manual actions, starting even from picking the tasks from a work pile in an Outlook inbox. Not all parts of the process are mindless in the words literal meaning but in general the work with some of the Case Company's back-office processes could be characterized as tayloristic as highlighted in the insurance termination process.

> *"You go to an email box where you have requests and there are e.g. 600 cases and you choose the oldest one, forward it to your own mailbox, and delete it from the common one. You go through what the customer wants to terminate, whether it is the whole package or a singular insurance… Sometimes it can be challenging to understand what should be terminated and you should only terminate what has been specifically named… When terminated, it automatically creates returns for the customer, and you need to add the bank account number there and be precise." (Service Advisor C)*

The process seems relatively prone to error, yet C mentions that before the robot it was fast and easy since most often the terminations consist of terminating the whole account of the customer including all insurance policies. Based on the robot TERM process, terminating all the insurances at once is seen as a simple task in comparison to terminating only one insurance from many, which after the implementation of RPA are regarded as exceptions to the process.

Some of the service advisors highlight the fact that prior to the robots introduction you had to save time from your working day to deliver and finalize certain back-office tasks:

> *"It used to take an extra hour of your day to do what the robots take care of today" (Service Advisor E)*

### 4.2.2 Changes in the work post RPA

Tasks that are automated with RPA are often rule-based and repetitive of nature and as we discovered earlier these were among the criteria for the Case Company when choosing processes for RPA. This seems to have created the work to be more challenging and consist more of mindful tasks after the reduction in mindless tasks, which has also been noticed by the agents when asked about changes in the workflows.

> *"The tasks that have been dropped off from us were routine, but sometimes the routine tasks felt a little bit like a break and now most of the tasks are something where your judgement is needed" (Service Advisor A)*

> *"It has also increased more challenging cases, now the robots get the bulk items and we are left with the tasks that require more time". (Service Advisor D)*

The workday of an agent seems to have become more mindful with the introduction of RPA, which was expected, and the reduction of easy breather tasks seems significant in how the agents view their daily work now after the robotic process automation. RPA has in some cases enabled or at least helped the agents to spend more time on the demanding tasks where they themselves see customer value as highlighted by Service Advisor D:

> *"We can focus on cases where for example customer needs an offer where you need to evaluate the 'bigger picture'... cases where the is not one correct single answer" (Service Advisor D)*

Interestingly, the introduction of RPA has not decreased the number of systems used by the agents but has rather decreased the amount of activities that agents perform within different systems as highlighted by Service Advisor C:

> *"The number of systems has not necessarily decreased, but the amount of tasks performed in different systems has decreased. For example, I don't handle terminations anymore and previously there has been campaign days to just reduce the pile in such activities. Now that time is utilized namely on actual customer service activities." (Service Advisor C)*

There can be seen a scope-narrowing effect in the magnitude of tasks performed by the agents throughout their days. The number of tasks has gone down somewhat with RPA handling some of the more mindless tasks and the tasks that are left are more mindful of nature. Service Advisor C described these mindless tasks as "mandatory evil", and Service Advisor E shares that those tasks take valuable time away from spending time on phone lines with the customers:

> *"I don't like work where I can't get anything out of it. I'd rather be answering the phones and selling insurance and not waste my time on terminations. Focus on existing customers and retaining them!" (Service Advisor C)*

> *"Robots have saved a lot of time and boring work, and now I can focus on relevant things. These are just side things where we are not creating any additional value" (Service Advisor E)*

With the same breath Service Advisor E adds that RPA has definitely reduced the number of activities, but also decreased the excess hassle with running from one room to another fetching print outs or envelopes which he/she sees as helping the handling times as well. This seems to be general feeling with all of the subjects that they see the robots in general as a helping hand for the whole team.

Not all of the changes are reducing work on all aspects, however. It can sometimes mean reorganizing work and processes to bundle cases to other agents. Some of the agents have been challenged with higher workload and more complex tasks since they handle exceptions of these robots. For example, Service Advisor B feels that robots have added her workload, but made it more challenging as well as B describes the exception handling process for robot BILL

> *"You get a message from customer and need to become an investigator when figuring out what customer is meaning and which open invoice are we talking about. The work itself is simple clicking work as long as you find the correct information... Often the exception is due to wrong customer or invoice number." (Service Advisor B)*

The agent interviewees were also inquired about what other work would the offer to the robots, to understand what type of mindless processes agents still see in their daily working life and to understand their workday's better. When inquired what other tasks and processes could the robots handle the service advisors could identify a couple of processes:

providing certifications and licenses to the customers and automating address change process. Certifications were mentioned by three of the participants and address changes by two interviewees.

> *"Address change robot. Customers move every month and we just do basic work by changing the address for a customer and that's it. Usually we should do a new service offer to the customer but often nothing else changes than the address. It is not unimportant work, but… The volumes are also highlighted during the ends of the months and come in bulks" (Service Advisor D).*

### 4.2.3 Subjective feeling about RPA and changes ensued

Previous literature highlights the fact that even though robots may offer help to the agents in their daily lives there may still live the fear of being made redundant in the company. The development advisors were thus asked about how they felt that the robots were received within the agents' teams. Both of the development advisors noted that they initially faced some grievance due to the way the information about the new robots were introduced.

> *"There were cases where the supervisors introduced a new robot and advertised that such cases (e.g. terminations) do not need to be worked on anymore… And the reality has been that there are still exceptions that need to be handled" (Development Advisor B)*

On the other hand, for some that advertisement sounded like a threat for their future. At the end of each interview the agents were asked about their feel the robots have had a positive or negative impact on their job and all of the interviewees viewed the robots having a positive impact on the agent work and customer service in general.

> *It has made the work more interesting when you don't need to do repetitive things all the time… something you might as well outsource from the company. You would just do it 'with your left hand' and huff and puff about the boredom and time wasting" (Service Advisor E)*
>
> *"It feels like when simple things are not there anymore and I have more time to focus on the challenging tasks, I can deliver better quality and focus more on sales" (Service Advisor A)*

Today, when the teams get updates about existing robots the Development Advisors feel that the agents have already forgotten about the robots and the work and tasks they handle, which is somewhat contradicted by the statements provided by the agents in the interviews. The Development Advisor B also adds that in the beginning when the agents were taken away some of the more mindless tasks it did have a significant morale boost on the team.

## 4.3 Contact center resourcing

Case Company utilizes workforce management software to help them reach their targets. Their planning process starts by creating the workload forecast for their different service channels and skill areas. They create the forecast in the system for 4 to 12 weeks in advance taking into account seasonal changes and bank holidays, and typical non-seasonal cycles such as end of month dates which create heavier volumes on both the phone lines and direct messaging. The forecasting process starts with historical data validation, then continues on to forecasting daily volumes per channel and then creating weekday patterns, essentially spreading out the daily volume through the intervals of a day. In the end, this result translates to how many agents are needed per any given interval in the scheduling period for all the skills and channels.

During the forecasting process, Case Company's WFM function needs also to ensure that their agents have correct skills applied, and that all the configurations per person are accurate. If an agent is being trained to a new skill it also needs to applied in the software. Agents also have absences and other special agreement and these need to be taken into account before starting the scheduling process. Workload forecasts are created for circa 10 different skills and channels, where direct messaging and different phone lines are the most important ones. Forecasts are created for the next scheduling period, which 4 weeks long and 2 weeks in the future from the publishing date.

After the workload forecasts have been created and all the person settings are correct, WFM can start scheduling. Scheduling in the WFM software is basically done with a few pushes of a button, since all the heavy lifting has been done before. The schedule is reviewed so that there are no gaps left in comparison to forecasted volumes, or whether there are gaps they are known of in advance and understood why. This step also includes scheduling of team meetings, trainings, and anything additional that needs to be applied to the agent schedules.

> *"We aim to create shifts with fairness in mind, taking different agents' strong suits and different times of year's exceptional volumes, such as bank holidays, into account." (CC Developer).*

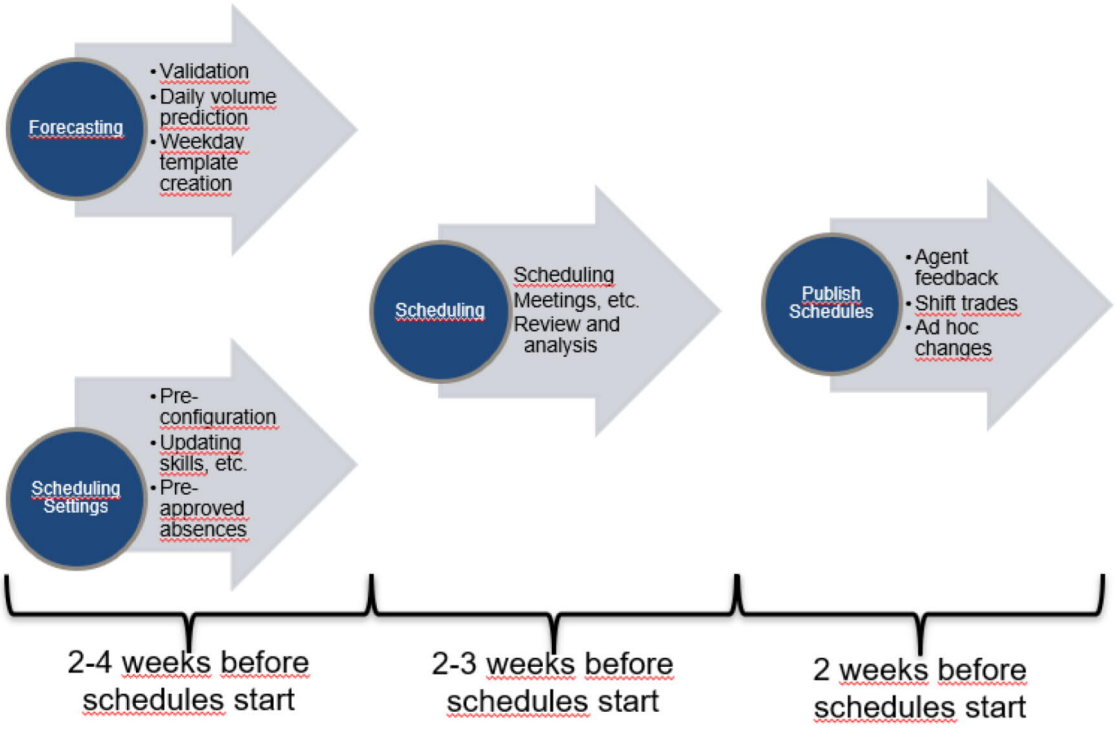


*Figure 7. Case Company planning process*

After the schedules are published 2 weeks before they become effective, agents can start trading their shifts and continue to request absences. This can cause changes in the staffing and thus some ad hoc decisions may need to be taken. Also, there can be changes to the forecast, e.g. a marketing campaign, which naturally leads to changes in the workload. Since agent contracts do not flex perpetually, such changes may cause further gaps in staffing.

### 4.3.1 Effect on contact center resourcing

As previously discussed, the motivation for the Case Company's RPA projects has been heavily on reducing back-office tasks from the customer service agents in order the free resources for the value creating, front-office tasks. This has also been highlighted in their choices of processes that have been automated

> "Simple tasks and processes that are large in mass and consist of multiple small activities" *(Development Advisor A)*

When considering the first automated process, termination of whole insurance account (TERM), there was a critical mass and the process is common for all the insurance companies. The work that the Case Company estimates to be freed is ca. 12 minutes per one termination and they also estimate that it has already saved them over 900 hours of work from late 2018.

> *"There is a lot of work with a termination, but the workflow is very simplistic… The only cognitive part is whether you are talking about a full contract termination or a singular insurance. Otherwise the termination itself is just clicking buttons" (Development Advisor A)*

With the following two robots, GREEN and BILL, the storyline remains similar. BILL handles requests for longer payment times and its demand is seasonal based on invoice payment dates, which previously caused added strain on already crowded phone lines. The motivation for BILL was to free up the time to be used to face customers rather than work on adding payment term and thus lengthen the handling time of a phone contact. The process itself is small, saving estimated 5 minutes of time but the seasonal mass was deemed significant enough to automate the process. Also, the Development Advisors added that there is no additional benefit for the agents than an easy handled task under their belt.

With robot GREEN, where the process includes physical movement from the agents, the estimated task handle time was between 10 and 12 minutes. This service has also a seasonal demand pattern, but instead of looking within the month patterns, GREEN sees a rise in demand during summers. Sometimes this seasonal demand has caused situations, where the contact center needs to close down its phonelines to handle the backlog of green cards. Interestingly the process that GREEN handles has been further developed side-by-side the robotic process automation by centralizing the mailing process as well. One of the agents described the process in detail:

> *"You first go to [Customer Portal], find customers registration license number, go to the correct row, print out the form, put it in an envelope and mail it. If you were working remote you had to ask someone else to print and mail it for you." (Service Advisor D)*

Service Advisor D also added that it feels like it takes about 5% of the time compared to previously and Service Advisor E has also noticed the difference in frequency:

> *"Green Cards for example are not to be found anymore in email boxes or on the phone lines. The robot has reduced the contacts a lot" (Service Advisor E)*

Seasonality seems to be in general on top of many of the employees minds, whether it is the development advisors or the agents. The seasonal nature of insurance branch is noted by those working in the front-line and was also noted when asked about potential new robots, where Service Advisor D mentions the need for an address change robot due to the high volume peaks at the ends of each month.

The fourth robot, E-INVOICE, was built from different perspective than resourcing efficiency. Even though its volume is high, the motivation was merely about the high cost of a paper invoice and was thus selected to be the fourth robot. Since its significance for resourcing is minor, it is not studied further in this thesis.

Altogether the Case Company estimates to have saved about 2400 hours of work during 2019 with robotic process automation. According to the development advisors it has significantly freed resources to the customer facing activities, specifically to the phone lines which has caused a noticeable rise in service levels. Other major benefit has been the reduction in channels that need to be forecasted, particularly the terminations that are currently mostly handled by robot TERM. Instead of needing to focus on forecasting this extra channel and its demand, it is now enough to set aside timeslots where agents can handle exceptions if needed. Otherwise this timeslot can be used on eLearning or catching up on other work items.

# 5 Discussion and Conclusions

With earlier literature review and the findings from the case study, this section links and discusses the two together. Research questions that this study answers are:

1) *How does back-office task automation affect customer service agents' work?*
2) *How does back-office task automation impact contact center resourcing?*

During literature review we reviewed what types of tasks are suited for robotic process automation and what enables and creates mindful work and work engagement. Then the review focused on understanding how contact center resourcing works and what is the role of a customer service agent. Finally, the link with task automation and work engagement, and automations theoretical effects on resourcing and staffing complexity was discussed. In a vacuum, the focus could be formulated to look at the Sarker et al. (2019) joint-optimization of the sociotechnical concepts from first the individual level of a contact center agent and then broadened to an organizational level when looking at optimizing the agent population through workforce management.

During empirical research section we focused similarly on the Case Company's robotic process automation and how it has changed customer service agents work and affected contact center resourcing. With this section, the thesis ties together the literature review and empirical research to discuss and answer the research questions in two separate sections.

## 5.1 Task automation affecting customer service work

To understand what tasks and processes are suitable for robotic process automation in contact centers we first familiarized ourselves with the task requirements for RPA. Reviewing the existing literature, the common terms used to describe such tasks were often routine, rule-based, and mundane. The criteria for robotic process automation was further outlined by Slaby (2012), Fung (2014) and Asatiani & Penttinen (2016). CapGemini (2017) study even offered plenty of examples for RPA such as periodic reporting, mass email generation and back-office transactions. What is common to all of the tasks is that they follow a rule-based logic, have low cognitive requirements and have no decision-making points in the process.

Routine, rule-based and mundane are also words often used to describe mindless tasks and actions which are ever present in a customer service agent's role. As we discovered in our semi-structured agent interviews a lot of the customer facing activities created back-office work where the agent was required to add information to multiple systems or select correct information to get a printout for the customer. As back-office tasks are often described as tasks where operators are not in direct contact with the customer and do not often create direct customer value, they are prevalent candidates for automation (Di Leva et al., 2017; Aguirre & Rodriguez, 2017).

Bakker et al. (2003) highlight that call center as a work environment is causing high rates of absenteeism due to many demands present for the agents, such as overload of work and sudden task changes. Zapf et al. (2010) also note the high level of stress that is attached to the interactions with the customer and the workplace itself due to contradicting demands among other factors. Based on the Job-Demands Resources model by Bakker & Demerouti (2007) the two variables, demands and resources are fighting over one another and affecting the employee's motivation and feelings towards the work. In contact center agent's work the demands could be categorized as pressures from facing a customer, efficiency expectations, constant changes in the tasks and work overload, which have been deemed to cause exhaustion in work life and lower the engagement. Contrary to the demands, offering autonomy, rewards and emotional support help empower and engage employees. Deductively, reducing work overload from agents, minimizing task changes within their workday design and simplifying expectations through working on fewer channels and methods could reduce the strain agents feel in their work.

RPA has been found to offer relief to employees by taking away tasks that had been felt as monotonous and boring. The employees could have thus focused on activities that had higher customer value and tasks that feel more interesting, resulting in more mindful work, higher employee engagement and in the end increased employee satisfaction (Lacity & Willcocks, 2018). This was also highlighted in the case study interviews, where multiple agents named that the robots have reduced the amount of work that felt unnecessary and meaningless compared to advisory work and sales that is done during normal customer interactions. One of the agents even mentioned that they would rather be working with the customer to retain them than working on the termination contract after they have failed to retain the customer. In this way, offering significant amounts of hours throughout the workday to make the agents feel themselves valuable with customer work seems to act as a resource offered to an employee. Similarly reducing agent's customer facing and sales

activities to a minimum is a job-demand that also has a potential salary effect, since their chances for attracting new business is reduced.

Automation also creates changes in the ways that the agents work in contact centers. Automation may create new tasks and posts and it reduces tasks from other agents, as happened with the Case Company where one agent was devoted to exception handling due to the lowered volumes of that exact process with robot GREEN. Interestingly highlighted in the managerial interviews when TERM robot was introduced to the customer service, the role of the human operator became more significant in the process even though the workload it has saved has been vast. There are a couple of trained agents going through different types of termination requests before feeding the work to the robot. This means that the cognitive part of the whole process is before the job is fed for the robot who then continues to execute the non-cognitive button pressing task of termination. This has led to the situation and reduction in tasks from the majority of the agents that has not gone unnoticed by the agents and can be classified as scope-narrowing effect on their daily work. All in all, reorganization of the processes around RPA have enabled both more mindful work for all of the agents, yet has narrowed it for one agent population and widened it for other parts of the population.

After analyzing the data from agent interviews it became also evident that implementing RPA in to back-office tasks can reduce job-demands and subsequently enable higher work engagement when analyzed from Bakker (2003) Job Demands-Resources model's perspective. Similarly, from Hackman et al. (1975) job characteristics model's perspective RPA has the potential to enable higher work engagement through offering more mindful and meaningful tasks for the agents. This was highlighted in the Case Company by offering the agents more time to work on tasks that have direct customer value, such as working on customer's insurance cases instead of using time on the now-automated back-office tasks. The fact that an agent has time to serve the customer to the best of their ability is not only meaningful for the agent but also to the company. As Peura-Kapanen et al. (2007) highlighted, customer service is one of the key factors when customers select insurance providers which is also the Case Company's industry.

With some interviewees the scope of the tasks throughout the day was narrowed down due to RPA and this could be seen as a negative factor based on job characteristics model, since skill variety is seen as an integral part of creating a mindful workday design. However, in this scope it would require the reduction to monotone and repetitive work, which in Case Company's example is not the case. The agent's still work on various activities with the customer, it is simply the back-office time that has faced significant reduction. The reduction

in the back-office tasks do have another noteworthy effect on the agent's workday since there still remains the caveat, that creating relentlessly mindful workdays can cause additional strain on the employees, which subsequently can negate the positive effects gained from the same automation as highlighted by Elsbach & Hargadon (2006). Similar comments have also been highlighted in the data and findings section, where the lack of the mindless action was evident in their workdays when compared to the time prior to RPA.

In conclusion, the introduction of robotic process automation to the Case Company has affected the workday structure of the customer service agents in a way that has been highlighted by Frey & Osborne (2013) and Autor et al. (2003), where computational power enables the focus to change towards activities that require higher cognition, and follow no rule-based logic. This has meant a shift towards higher customer facing time throughout the agents' days compared to time prior to RPA, reducing mindless tasks yet somewhat narrowing the scope of customer service tasks worked on throughout a working day.

## 5.2 Task automation impacting resourcing

To understand how task automation impacts contact center resourcing, we need to first understand what the different activities and parameters are within staffing a contact center. As Bhulai et al. (2008) stated the four stages of labor allocation are 1) workload prediction 2) staffing 3) shift scheduling and 4) rostering. Workload prediction is the act of creating a forecast of the work for the future. Staffing turns this amount of work into number of agents required. Shift scheduling then meets the desired amount and rostering is the act of assigning these generated shifts to the employees. Case Company's planning process is slightly different since the WFM software utilized in the company has a slightly different marching order based on direct observation. Steps 1 and 2 have the same outcomes, since the forecasting process of the WFM software includes both steps, providing the required number of forecasted agents per any given interval as the end-product of forecasting. However, steps three and four differ slightly, even though the end-result would be similar. The workforce management software used in the company follows a slightly different planning logic that is built on pre-configured rules per an employee, rather than first creating the needed shifts. This way the software allocates the best-fitting shifts to an agent that already fulfills that agent's personal scheduling restrictions (e.g. preferences, availabilities etc.) and other work rules (e.g. nightly and weekly rest time, target hours etc.). This essentially turns the Bhulai et al. (2008) order on steps 3) shift scheduling and 4) rostering to assigning predefined

scheduling rules to an agent and then fitting those rules into a schedule so that they best match the forecast created in steps 1 and 2.

The order of the process is not meaningful but does provide context for understanding all the necessary steps to provide resourcing need for a contact center and subsequently fulfilling that need. There are a few distinct aspects where RPA can offer help in contact center resourcing. First one is naturally the reduction in hours needed to work, since RPA tends to save time from the processes. Secondly, RPA can reduce the number of channels that are needed to be forecasted and subsequently staffed. This reduction in channels has a multitude of effects on resourcing such as potentially reduced margin of error in forecasting and easier skill matrixes to maintain within the agent population. Thirdly, RPA can in certain cases substitute the human operator from certain processes and free them to be used in more cognitively requiring processes.

Task automation naturally impacts the resourcing which is already highlighted by the sheer amount of saved worktime in Case Company's example of the robot TERM, where the estimated saved time per Case Company was 930 hours for year 2019. 930 hours means roughly one gross FTE and approximately two net FTEs when shrinkages are deducted from gross FTE number. The amount of labor from that singular back-office task can then be utilized in other tasks, such as customer facing activities which deductively should increase service levels and reduce queueing times or decided to be saved completely which saves personnel costs.

Not only is the sheer number of hours saved a significant factor but also from which point of time those hours are saved can be an additional benefit. Robot BILL handles the requests for lengthening an open invoice's payment term and this has a seasonal pattern according to the invoice due dates, which often fall to the end of each month. Due to the fact that the hours available for work are not very flexible from the Case Company's point of view, since agents can't flex their working hours up and down due to union regulation and legislation, the seasonality of some channels and services can cause issues in staffing which was apparent in the case company. According to Andrews & Cunningham (1995) and Tanoury (2006) many companies face seasonality in their contact center demand patterns which thus affects the ability to reach required service levels during differing points in time. For the Case Company this holds true for the yearly and monthly seasonality and even within a week Mondays face heavier workload compared to other weekdays. Having less seasonality, among with less channels, has offered the company easiness in forecasting and staffing, when seasonal spikes in demand are not present in the act of workforce management

and are merely handled by the robots. The reduction in channels and skills only holds truth when a significant part of the whole process can be automated with RPA and that the process had a significant expertise requirement and volume in it to justify a resourcing focus on that task, which in the Case Company's example was only relevant for robot TERM.

The task automation has had some unexpected benefits as well during CoVid-19 pandemic. Some of the tasks had previously been tied to a physical spot due to manual labor included in the process, such as the green card process. Even though customers probably can't travel as much as before, if someone needs a green card now, it can still be delivered much thanks to the automation of the process with robot GREEN. This is applicable to other processes outside of the Case Company as well, since the robots are not tied to a place or time, and do not require vacation (Anagnoste, 2017; Willcocks et al. 2016).

Altogether the Case Company estimates to have saved about 2400 hours of work during 2019 with robotic process automation. According to the development advisors it has significantly freed resources to the customer facing activities, specifically to the phone lines which has caused a noticeable rise in service levels. Other major benefit has been the reduction in channels that need to be forecasted, particularly the terminations that are currently mostly handled by robot TERM. Instead of needing to focus on forecasting this extra channel and its demand, it is now enough to set aside timeslots where agents can handle exceptions if needed. Otherwise this timeslot can be used on eLearning or catching up on other work items. Tanoury (2006) highlighted the requirements in contact center forecasting are manifold and the number of channels that require forecasting puts high strain for forecasting teams. Simply put, reducing the number of forecastable channels is already a win by saving time from the forecasting and scheduling process from the WFM team, and reducing the risk for errors when the complexity is lowered.

Previously Lacity & Willcocks (2017) triple win was argued from the employee value perspective when looking at the benefits of the robotic process automation, yet arguments for both the customer and shareholder values can be made when analyzing its impact on resourcing. The sheer number of reduced hours of work from the human labor is saved currency in shareholder pockets if we consider that the work would in any case needed to be done, with or without the automation. Similarly, customers have benefited from this when Case Company has moved more labor focus on the customer facing lines from the back-office duties. This should subsequently lower queuing times, enable swifter entrance to service and thus provide greater customer satisfaction (Nosek & Wilson, 2001), which are

key success factors for especially insurance companies as highlighted by Peura-Kapanen et al. (2007).

## 5.3 Main Findings

This thesis studied customer service operations of an insurance company's contact center and analyzed how robotic process automation has impacted its resourcing and customer service agents' work. More specifically, the aim is to answer how back-office task automation affects customer service agents' work engagement and their workdays and how RPA's introduction has impacted the workforce management, forecasting and staffing, in the Case Company. Firstly, the thesis aimed to understand the automation methodology, robotic process automation, and its pre-requisites as the choice of automation by studying existing literature. It became quickly evident that rule-based and repetitive, mindless tasks where often at the sweet spot for RPA as the most suitable subjects to be automatized.

Similarly, understanding existing literature and theory of what attributes and events impact a customer service agent's workdays and work engagement helped to establish a link between the two subjects. Work engagement seems to decrease when the tasks at hand do not seem relevant, feel mundane to the agents, and require low cognition. These very task characteristics match with the RPA criteria set for tasks, which opens a fruitful opportunity for an empirical study around the subject. At the same time, automation has traditionally been motivated by cost effectivity and savings which spark the questions in contact centers: how it impacts our resourcing and staffing as well as the agent populations work.

The study found out that reducing and automating tasks from the agents not only changes their workday design and can offer them more time to work on more demanding and cognitive tasks, but also has the potential to simplify skill structures of contact centers and move labor towards value creating front-office tasks. Similarly, the study highlights potential pitfalls with creating purely mindful workdays for the agents, where lack of mindless activities can cause higher strain for the agents. RPA in contact center back-office tasks offers agents more time and focus on customer facing tasks, reducing the amount of activities they work on throughout the day and can thus increase employee engagement in contact centers. Similarly, RPA can provide a relatively cheap option to work on mindless back-office tasks and offer the company with the option to either move the freed FTEs towards customer facing activities and increase service level performance or save the FTEs in costs. Not only does RPA need to create flatline savings, but seasonal peaks can be

handled more easily with the help of robots and thus avoid growing queues on the phones and backlogs in other channels further enhancing the service levels in traditionally vulnerable times.

Based on the sociotechnical perspective of information systems (Sarker et al. 2019) framework, previous literature and the case study in this thesis, we can clearly see that robotic process automation in contact center back-office tasks can yield results to both the instrumental objectives as well as humanistic objectives. Instrumental and humanistic objectives highlighted in this thesis are concluded in the table 6 below.

| **Objective and Domain** | **What we knew based on previous research** | **Main findings in thesis** |
|---|---|---|
| Humanistic:<br>job demands affecting work engagement negatively | High strain, overwork, and low-level of autonomy reduce work engagement | RPA reducing mindless activities releases strain from agents to focus on tasks that create more customer value and thus increase work engagement |
| Humanistic:<br>positive job characteristics enabling mindful and meaningful work | Skill variety, task significance, autonomy, and understanding your input affecting the end-result create higher engagement to work. Subsequently low-level of say, monotone, and insignificant work reduce engagement | High skill variety does not necessarily provide additional value to employees, since too many changes throughout the day in tasks can create additional strain. Task significance seems to factor more in Case Company from job-characteristics view. |
| Humanistic:<br>Triple-win; creating employee value with RPA | RPA increasing employee satisfaction, enabling them to learn new skills and focus on more valuable tasks | RPA can increase employee value significantly, depending on the process and task chosen for automation |

| | | |
|---|---|---|
| Instrumental:<br>RPA reducing/shifting FTE requirements and thus creating value to contact centers | RPA helps contact centers handle higher contact volumes, whether in bulk or part of the process. RPA offers value to customers by reducing queueing and throughput times | RPA not only reduces workload in bulk but can have a significant effect on peak-seasonal workloads whether daily, weekly or monthly, when resources can't flex. |
| Instrumental:<br>RPA reduces complexity in contact center functions | Multi-skilled contact centers face high complexity in resourcing and customers are becoming channel agnostic resulting in more complexity | RPA can reduce channels needed to be staffed reducing the complexity ensuing from a multitude of skills and channels. |

*Table 6. Main findings of the thesis*

In conclusion, the introduction of RPA to contact center back-office tasks can offer Lacity & Willcocks (2016; 2017) triple-wins both from operational efficiency perspective creating shareholder and customer value, as well as enhancing customer service agents engagement, creating subsequently employee value.

## 5.4 Managerial implications

This thesis studied customer service operations of an insurance company's contact center and analyzed how robotic process automation has impacted its resourcing and customer service agents' work. In contact centers, where operational efficiency and cost reductions are commonly sought after, RPA can provide one helpful and relatively lightweight tool in automating customer service operations, especially with back-office tasks that are by-products of customer service interactions.

When evaluating, and even setting, the criteria for success, companies can potentially look further than the traditional operating efficiency and profit metrics. In today's environment competent employees are becoming more and more valuable, and thus looking at automation's effects on employees' work, automation enhance their engagement to work and deductively offer greater longevity in their employment with the company. Contact centers are already facing high attrition rates but enabling the employees to work on more mindful and engaging tasks with the help of automation, companies could combat the turnover rates and turn longevity into profit.

The study examines what type of task automation can offer both more engaging work for the agents and how those tasks can impact contact center resourcing in a positive way. It also highlights other not-so-obvious benefits from the introduction RPA, such as its potential impact on seasonality of workloads and its indirect impact on service levels. Any contact center leader or WFM manager interested in optimizing their workforce and performance further can look at this thesis from two potential perspectives: either focusing on the management point of view of how to ensure your staff can be efficient and enjoy their work in the long-run and/or how to find ways to make contact center resourcing and workforce management more efficient by finding the low-hanging fruits in your processes to automate.

The study provides insights to contact center and company leaders, workforce management, and IT operations, on how to approach robotic process automation or other automation methods to combat bulk tasks that offer no direct customer value. This thesis offers valuable look at an automation method that requires little-to-no IT competence and does not necessarily require the help of IT operations meaning faster time to production. The study can be read as an operational guideline to see what type of tasks should the development teams focus at or from a broader perspective, to analyze how customer service operations can tackle issues in agent population workdays and lack of engagement.

## 5.5 Limitations and future research subjects

Drawing conclusions based on analyzing singular factors in either Job-Demands Resources model or job characteristics model does not necessary offer the full picture of employees work engagement. This thesis has however used these models as indications of how the changes in work processes and activities affect and impact the customer service agents work and does not try to holistically understand the whole picture. The thesis does not either offer direct instructions on how to automate the processes nor does it tell which processes different companies should automate, rather it offers guidelines on what attributes and task characteristics the automation team should focus on.

The robots were an improvement in the Case Company according to the customer service agents which was highlighted by all the interviewees. This could naturally be due to the robots being relatively new and that the Case Company has chosen more technology positive subjects to the interviews, but all the customer service agents saw the value in robots work. The situation could be seen differently if the service advisors chosen for the interviews

were picked with random selection and could thus open up new, slightly more challenging and negative views to the robots in the Case Company.

The study was concluded as a single case study where all of the subjects where chosen from the same customer service organization within the same company. This method has its limitations, since the changes ensued in their workdays are subject to the change management and competences of a singular development team rather than painting the full picture of RPA's changes in all customer service operations throughout all companies. Similar limitations should be considered with the effect on resourcing, where the changes are again subject to the same one organization. Case Company planning process has also been affected by the introduction of new workforce management tool which offers the company greater perspective and understanding of their operations, which was evident during the user observation and thus reducing its validity. Without this insight, the effect RPA has had on resourcing could be seen differently. Based on the single case study methods weaknesses, additional single or multiple case studies could be a fruitful future research topic to further understand how back-office task automation manifests itself in agent work and contact center resourcing.

This thesis did not focus on the job-demands resources model resources either, and another future research subject could be to understand not only what demands does automation deviate but what resources it can offer to the agents. This thesis focused on the reduction of demands which are the counterparts of resources in the balancing act of job-demands resources model. Another fruitful focus could be to simulate pre- and post-automation situations of contact center resourcing in the same contact center to highlight and deep-dive into the service level effects RPA has had, and analyze quantitively the changes ensued.

Eriksson & Kovalainen (2008, p. 291) name that a qualitative research's reliability can be analyzed by looking at the study's reliability, validity, and generalizability. The reliability was sought to be proven by describing punctually how the study has been conducted: the methods used in data collection and analysis, and what literature has been chosen. The validity of the study has been in focus with using several different methods in the data gathering, including interviews in two subject levels and in the literature review, with focus on several separate sources including books, older and newer research papers, and workforce management company's materials. Thirdly, the generalizability of the study is at question and this has been assessed by focusing on a limited area of an organizations work in customer service operations. The focus has been on back-office tasks that are found in most of the

contact centers regardless of the branch. The study can as such be generalized to multiple contact center operations, where agents work on both front- and back-office tasks throughout their days.

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# Appendix A: Interview questions to the agents

**Taustatiedot**

Kerro lyhyesti itsestäsi:

• koulutus
• aikaisempi relevantti työkokemus
• titteli
• työtehtävät (Mitkä ovat työtehtäväsi? Arvioi käyttämäsi työaika viikossa per tehtävät)

**Vanhat työtehtävät, tietojärjestelmät ja niiden käyttö – ennen ohjelmistorobotiikan käyttöönottoa**

Kuinka monta erilaista järjestelmää (ja mitä järjestelmiä) teillä oli käytössä ennen ohjelmistorobottia? Listaa järjestelmät.

Voitko kertoa mahdollisimman tarkasti vaihe vaiheelta, miten hoidat tehtävää? Esim., miten syötät tietoa järjestelmään, mikä on toistuvaa ja/tai rutiininomaista prosessissa, tai milloin sinun tarvitsee keskittyä syvällisesti, ja niin edelleen. *(Toista tarvittaessa eri prosesseille)*

Tarkenna tarvittaessa tiedon manuaalisesta siirrosta, päivittämisestä jne. ja tehtävän toistuvuudesta.

Kuinka paljon käytit aiemmin työaikaa mihinkin tehtävään?

**Nykyiset työtehtävät, tietojärjestelmät ja niiden käyttö – ohjelmistorobotiikan käyttöönoton jälkeen**

Mitä järjestelmiä (kuinka montaa) käytät tällä hetkellä työssäsi ja mihin tarkoituksiin?

Mitä järjestelmiä ohjelmistorobotti korvasi?

Voitko kertoa mahdollisimman tarkasti vaihe vaiheelta, miten hoidat tehtävää? Esim., miten syötät tietoa järjestelmään, mikä on toistuvaa ja/tai rutiininomaista prosessissa, tai milloin sinun tarvitsee keskittyä syvällisesti, ja niin edelleen. *(Toista tarvittaessa eri prosesseille)*

Kuvaile, miten käytät nykyisiä järjestelmiä, joissa ohjelmistorobotti on käytössä.

**Ohjelmistorobotiikasta – arvio muutoksesta**

Miten RPA on vaikuttanut sinun työtehtäviisi:
• tehtävät / prosessit
• subjektiivinen arvio työn muutoksesta
• subjektiivinen arvio muutoksista järjestelmien käytössä

Onko työn leveys (skaala) muuttunut RPA:n käytön myötä? Miten skaala on muuttunut?

Mihin työtehtäviin ohjelmistorobotiikan käyttöönotto vaikutti vähentäen kyseisiä tehtäviä?
*Jatkokysymys: kuvaile kyseisten työtehtävien luonnetta*

Mihin työtehtäviin ohjelmistorobotiikan käyttöönotto vaikutti lisäten kyseisiä työtehtäviä?
*Jatkokysymys: kuvaile kyseisten työtehtävien luonnetta*

Näettekö ohjelmistorobotit positiivisena vai negatiivisena työtehtäviesi kannalta, ja miksi?

Jos ohjelmistorobotit voisivat ottaa lisää työtehtäviäsi hoitaakseen, mihin työtehtäviin suosittelisit ohjelmistorobotiikan hyödyntämistä?
*Jatkokysymys: kuvaile kyseisten työtehtävien luonnetta*

**Lopetus**

Kiitokset ja lupa olla yhteyksissä myöhemmin aiheen tiimoilta.

# Appendix B: Interview questions to the managers/service developers

**Taustatiedot**

Kerro lyhyesti itsestäsi:

- koulutus
- aikaisempi relevantti työkokemus
- titteli/rooli
- työtehtävät
- nykyisen työsuhteen pituus

**Asiakaspalvelukeskuksen toiminta**

Voitko kuvailla asiakaspalvelukeskuksen organisaatiohierarkiaa?

Mitä seikkoja työvuorosuunnittelussa otetaan huomioon?

Mihin resurssienjakautuminen eri työtehtävien välillä perustuu?

**Automatisoidut Back-office prosessit/tehtävät**

Mitä prosesseja on automatisoitu? Yleiskuva ja tausta

- Milloin otettu käyttöön/automatisoitu?
- Miksi kyseinen prosessi valikoitui automatisoitavaksi?

Prosessikuvaus automatisoidusta työtehtävästä/työtehtävistä?

- Prosessikuvauksen läpikäynti
- Robotin työaskeleet prosessissa
- Osallistuuko agentti prosessiin
  - Miten agentti osallistuu prosessiin?
- Mitä vahvuuksia/hyötyjä automatisointi on luonut?
- Mitä heikkouksia automatisoinnin myötä on havaittu?

*(Toisto muille automatisoiduille prosesseille)*

- Mitä prosesseja harkittiin, mutta ei valikoitu automatisoitavaksi?
  - Mistä syystä ei valittu?

**Automatisoinnin vaikutuksen arviointi ja tulokset, learned lessons**

- Arvioitu vaikutus back-office työhön?
  - Vapautuva resurssi muuhun työhön? FTE arvio?
    - Mihin vapautuva työ siirtyy?
  - Minkälaisia virheitä robottien työssä ilmenee – miten poikkeuksien käsittely toimii?
- Arvio vaikutuksesta agenttien työhön?
  - Työtehtävien muuttuminen?
  - Työn laadun muuttuminen?
  - Miten robotti otettiin vastaan tiimeissä?

- Mihin työtehtäviin ohjelmistorobotiikan käyttöönotto vaikutti vähentäen kyseisiä tehtäviä?
  *Jatkokysymys: kuvaile kyseisten työtehtävien luonnetta*
- Mihin työtehtäviin ohjelmistorobotiikan käyttöönotto vaikutti lisäten kyseisiä työtehtäviä?
  *Jatkokysymys: kuvaile kyseisten työtehtävien luonnetta*

**Lopetus**

Kiitokset ja lupa olla myöhemmin yhteydessä.